DOCUMENT RESUME

ED 279 350 IR 051 874

AUTHOR	Griffiths, Jose-Marie; And Others
TITLE	Diffusion of Innovations in Library and Information Science. Final Report.
INSTITUTION	King Research, Inc., Rockville, Md.; NETWORK, Inc., Andover, MA.
SPONS AGENCY	Office of Educational Research and Improvement (ED), Washington, DC.
PUB DATE	Nov 86
CONTRACT	300-83-0243
NOTE	430p.
PUB TYPE	Reports - Research/Technical (143) -- Tests/Evaluation Instruments (160)
EDRS PRICE	MF01/PC18 Plus Postage.
DESCRIPTORS	*Adoption (Ideas); Annotated Bibliographies; *Bibliographic Utilities; Case Studies; *Diffusion (Communication); *Information Dissemination; Information Science; *Innovation; Models; *Online Searching; Public Libraries; Questionnaires; Research Libraries; Special Libraries
IDENTIFIERS	*Diffusion Networks; Output Performance Measures

ABSTRACT

This study examined four aspects of the diffusion of innovations in library and information services: (1) when and why innovation occurs in the library and information field; (2) what linkages (communication channels) exist that result in a flow (dissemination) of information; (3) what model(s) and methods have been effective in the diffusion process; and (4) what options and recommendations are needed to develop a plan for diffusion networks for library innovation. The development of a model is described; the status and prospects of innovation in the 1980s are considered and selected innovations in bibliographic utilities, online searching, and output performance measures over time are traced; and 54 individual case studies of the adoption and use of innovations at 18 academic, public, and special libraries are analyzed. Finally, 11 hypothesis clusters of special interest in understanding the diffusion process are presented, and their implications for the development of a diffusion network are considered. Appendices include the data collection instruments, a 62-item annotated bibliography and a longer full bibliography, and a summary of each of the case studies. (KM)

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DIFFUSION OF INNOVATIONS IN LIBRARY AND INFORMATION SCIENCE

Final Report

November 1986

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IR051874

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Diffusion of Innovations in Library and Information Science was prepared for the Office of Educational Research and Improvement under Contract No. 300-83-0243 with the Department of Education. This report does not necessarily reflect positions or policies of the government, and no official endorsement should be inferred.

TABLE OF CONTENTS

Page

SECTION 1 DIFFUSION AND UTILIZATION OF LIBRARY AND INFORMATION INNOVATIONS 1

1.1 Background 1
1.2 State-of-the-Art Knowledge Regarding Library Systems and Library Functions 2
1.3 The Library Utilization Gap 3
1.4 The Current State-of-the-Art Regarding the Diffusion and Utilization of Innovations and Technical Knowledge 4
1.5 Current Knowledge of Planned Diffusion and Utilization Efforts: Campaigns, Services, Systems and Networks 6
1.6 Project Description 8

SECTION 2 A MODEL FOR UNDERSTANDING DIFFUSION AND UTILIZATION IN THE LIBRARY AND INFORMATION SCIENCE FIELD 9

2.1 Introduction 9
2.2 A Preliminary Model of Diffusion and Utilization of Innovation in Libraries 18
2.2.1 Key Characteristics of Libraries and Library Professionals as Innovation Adopters and Users 21
2.2.1.1 Libraries as Adopting Systems 21
2.2.2 Librarians as Innovators or Innovation Adopters 25
2.3 Characteristics of the Social Network Which Connects Libraries to Innovation Producers and Vendors 32
2.4 Characteristics of Innovations in the Library Field as a Whole: 1960 - 1985 42
2.5 A Revised Model of Diffusion and Utilization of Innovation in Libraries 49

SECTION 3 INNOVATION STATUS AND PROSPECTS IN THE 1980s 52

3.1 Significant Innovations of the 1970s and 1980s 52
3.2 Potential Impact on the Improvement of Library Systems and Services 53
3.2.1 Automated Acquisitions 53
3.2.2 Automated Serials Control 53
3.2.3 AACR II Adoption 54
3.2.4 Bibliographic Utilities 54
3.2.5 Multi-Type Networking 55
3.2.6 Automated Cataloging 55
3.2.7 Online Catalog 56
3.2.8 Online Searching 56
3.2.9 Automated Circulation 57
3.2.10 Cable Services 58
3.2.11 Charges for Services 58
3.2.12 Community Information and Referral Services 59
3.2.13 Planning Process 59
3.2.14 Output Performance Measures 60
3.2.15 Integrated Library Systems 61

TABLE OF CONTENTS (Continued)

Page

SECTION 3 INNOVATION STATUS AND PROSPECTS IN THE 1980s 52

3.3 Most Significant Innovations: The Selection Process and Defining Parameters 61
3.3.1 Delineation 62
3.3.2 Significance 63
3.3.3 Measurability 64

SECTION 4 TRACING OF SELECTED INNOVATIONS OVER TIME 68

4.1 Bibliographic Utilities 68
4.2 Online Searching 77
4.3 Output Performance Measures 83

SECTION 5 INDIVIDUAL CASE STUDIES OF INNOVATION ADOPTION AND USE 87

5.1 Methodology 87
5.2 Individual Case Studies 94
5.2.1 Library and Personal Characteristics Identified through the Case Studies 94
5.2.2 Analysis of Innovative Versus Non-Innovative Libraries 107
5.3 Cross Case Analysis by Innovation Type 116
5.3.1 Adoption of Bibliographic Utilities 118
5.3.2 Adoption of Online Searching 138
5.3.3 Adoption of Output Performance Measures 162
5.4 Cross Case Analysis by Type of Library 169
5.5 Cross Case Analysis by Time of Adoption 171
5.5.1 Early Adopters 171
5.5.2 Mid-Adopters 172
5.5.3 Late/Non-Adopters 185

SECTION 6 MAJOR CONCLUSIONS 190

6.1 Hypothesis Cluster #1: Innovation Characteristics 194
6.2 Hypothesis Cluster #2: The Library's Social Infrastructure 196
6.3 Hypothesis Cluster #3: Gross Library Characteristics 197
6.4 Hypothesis Cluster #4: Characteristics of Librarians 199
6.5 Hypothesis Cluster #5: Networking and Professional Training 200
6.6 Hypothesis Cluster #6: Communication Activity by Promoters and Vendors 200
6.7 Hypothesis Cluster #7: Provision of Financial, Personnel, and Material Resources 201
6.8 Hypothesis Cluster #8: The Innovation Adoption Process 202
6.9 Hypothesis Cluster #9: Level of Use of Innovations Over Time 204
6.10 Hypothesis Cluster #10: Benefits and Costs 205
6.11 Hypothesis Cluster #11: Diffusion as a Consequence of Innovation Adoption 206

TABLE OF CONTENTS (Continued)

Page

SECTION 7 INNOVATIONS FOR THE DEVELOPMENT OF A DIFFUSION NETWORK 207

7.1 Introduction 207
7.2 Implications of the Study for Design of a Diffusion Network 207
7.2.1 Issues in the Design of a Diffusion Network 211
7.3 A Proposal for a National Network for Diffusion of Library and Information Innovations 212
7.4 Roles and Responsibilities for Implementation of a Diffusion Network 215

APPENDIX A DATA COLLECTION INSTRUMENTS

APPENDIX B ANNOTATED BIBLIOGRAPHY AND FULL BIBLIOGRAPHY

APPENDIX C CASE STUDIES

SECTION 1

DIFFUSION AND UTILIZATION OF LIBRARY AND INFORMATION INNOVATIONS

1.1 Background

It is widely recognized that technological advances over the last two decades have provided the opportunity for vastly improved library services. There is no aspect of library function for which this profusion of innovations is not relevant, and collectively, currently existing know-how has the potential of creating a nationwide library system which can serve greater numbers of users in more ways, at higher speeds, with greater accuracy and even at lower costs than would have been thought possible only a decade ago. In spite of such advances related both to the hard technologies of information processing, microforming, telecommunicating, etc., and the softer technologies of systems management, evaluation, needs assessment, and planning, there appears to be a rather large gap between the possible and the actual for nearly all libraries. The purpose of this project is to begin to address this "utilization gap", through a rationally sequenced approach, starting with a documentation of the gap and the illustration of critical issues, barriers, and opportunities by the tracing of a small number of highly significant innovations of recent origin as their adoption has spread over time. With the resulting understanding of stages, appropriate and effective channels, and linkage processes it is possible to construct a preliminary model of optimal innovation diffusion and utilization in the library field; a model which should be of wide usefulness to library-related professionals and policy makers. The project will also include a proposal for how the model might be interpreted and utilized by specific audiences to improve those parts of the total system of libraries and information systems which serve the American public.

To understand the importance, the potential, and the timeliness of this project it is necessary first of all to provide some background on the major issues that are to be addressed. In gross terms they break down into four categories: (1) the current state-of-the-art in library-related developments and technologies and the potential of existing knowledge for the optimization of library systems; (2) the nature and extent of the "utilization gap"; (3) the current status of knowledge concerning utilization gaps and how they can be filled; and (4) the means by which planned efforts can be undertaken and have been undertaken in various fields to close the gap.

1.2 State-of-the-Art Knowledge Regarding Library Systems and Library Functions

Most of the technical knowledge which applies directly to library system operations is derivative in the sense that it was not originally invented or developed with libraries specifically in mind. This would apply, for example, to the development of microphotography, high speed print copying, data processing, miniaturization of data processing, telecommunications, and telecopying equipment. It would also apply to the so-called "soft" technologies of systems analysis, linear programming, scientific sample surveys, and planning and evaluation tools and methodologies which now permeate all fields of endeavor. Because none of these developments originated in either libraries or library science there has long been what could be called the "development gap", i.e., the gap between a recognition of what is possible to transform library operations and the availability of off-the-shelf library-specific technologies. That such a development gap still exists today in some ways confounds our understanding of the important issues because the promise of the yet-to-be-developed applications often seem more exciting than the mere application of what is now ready to be used. Thus, for example, there is a tendency for would-be innovators to rush ahead with the adoption of microcomputer hardware because it is now the rage in society, despite the fact that for the most part appropriate and cost-effective software and system configurations that would give the micro a meaningful and important role in library systems have yet to be worked out. On the other hand, the development gap has been closing in a number of areas such as online bibliographic reference searching, automated cataloging, electronic networking for interlibrary loans, satellite communications, use of cable technology, and so on.

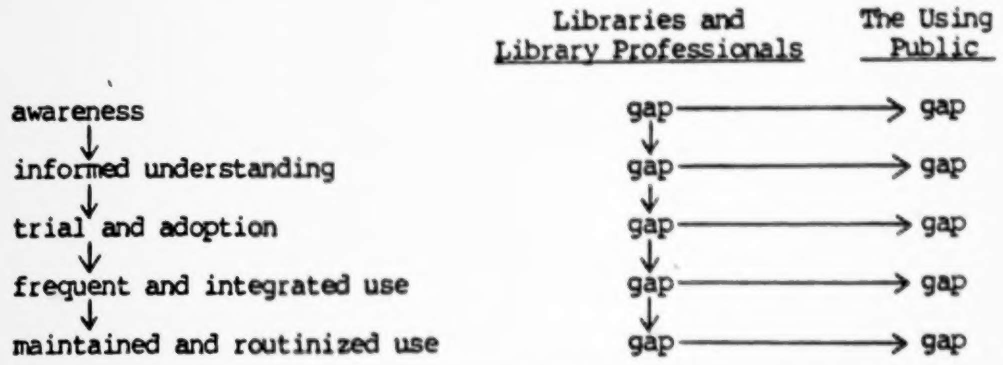
1.3 The Library Utilization Gap

Even with a very long list of currently available and demonstrably useful innovations in the library field, just one short visit to most libraries in the United States would reveal a rather dramatic short-fall between what is acknowledged state-of-the-art and what is actually happening. Some libraries will probably have some version of the majority of these innovations in place while most libraries will have few, and a great number will have none at all. Moreover, even at the libraries that have implemented innovations there will be a manifest gap between availability of the technology and its actual utilization either by library staff or the using public. Most equipment is underused. Most microform readers sit idle much of the time; most online search services operate below capacity. Most handy reference tools and guides are often ignored by those who could derive benefit from them. Thus the "utilization gap" can be seen to have a number of dimensions and levels. Careful analysis reveals at least 10 distinct types of gaps that might apply to any one technology as displayed in Figure 1.

FIGURE 1

TEN CONTRIBUTORS TO THE UTILIZATION GAP

(for any given ready-to-use innovation) on the part of:


Libraries and Library Professionals
The Using Public
awareness
informed understanding
trial and adoption
frequent and integrated use
maintained and routinized use
gap
gap
gap
gap
gap
gap
gap
gap
gap
gap

Arrows are drawn in Figure 1 to suggest a probable or logical sequence and set of relations among these various gaps. One first becomes aware of an innovation; then, if interest develops, one gains more specific understanding of what the innovation is and how it relates to one's own situation and needs; such understanding, if it results in a positive evaluation, will lead either to adoption or to tentative adoption in the form of a trial; after adoption there may yet be a critical gap between "having it" and "using it", and an understanding which only comes with experience of how use relates to and can become a part of general library practice; finally, such levels of use may be achieved over a short period of time only to lapse when other innovations come along or when budgets are cut; the ultimate test of the utilization of an innovation is thus its long-term survival as a part of the on-going system. At each of these stages there is a counterpart "gap" among all types of users. To a large degree, users are influenced either by what they learn from the mass media or what they learn from and how they are influenced by fellow users. Nevertheless the library community has some responsibility and a clear function in helping to fill these user gaps. It is also not out of the question that sometimes users will exert counter-influences on the library professionals, urging on them various new technologies that they have learned about through the media or through awareness of what other libraries are doing.

1.4 The Current State-of-the-Art Regarding the Diffusion and Utilization of Innovations and Technical Knowledge

This project reflects a growing awareness among policy makers in the library sphere that there is a substantial and growing body of knowledge regarding the innovation and innovation diffusion process which can and should be used in the improvement of library systems and services. The first major synthesizer of such knowledge was Everett M. Rogers (1962, 1971, 1983). Through the review and systematic analysis of several hundred studies of the diffusion of innovations drawn from fields as diverse as agriculture, medicine, education, industry, and community development, Rogers demonstrated that there was a substantial base of empirical studies which pointed in consistent directions. In particular, these studies highlighted the importance of social interaction and suggested that adoption of innovation was a process which took place in a distinct accelerating pattern over time, highly influenced by innovation characteristics of relative advantage and observability, the combined use of different media, and active interventions by change agents. Havelock (1969), building partly on Rogers but adding consideration of studies of planned change in organizations, social problem-solving, and psychological factors, reviewed over 4,000 items of literature and developed a synthesis on the diffusion and utilization of all types of technical knowledge under the title Planning for Innovation through the Dissemination and Utilization of Knowledge. Havelock put forward the concept of "linkage" as a way of understanding the innovation process simultaneously as an act of individual and group problem-solving and as an act of bilateral communication and transfer of knowledge. Linkage theory suggests that innovation utilization results from the interaction of separate systems, each of which has the ultimate responsibility of serving its own needs in its own ways but with the willingness and capacity to open themselves at crucial moments to the input and influence of others. Libraries would appear to stand in such a relation to one another and to the various vendors and promoters of new technologies.

The 1970s was a period of great expansion of knowledge diffusion studies generally, marked by the emergence of research centers devoted to this topic at Michigan and Pittsburgh, by other major reviews by Glaser (for NIMH, 1976) and Zaltman, et al. (1973), and by the emergence of a new journal, Knowledge, which has served as a forum for new research and theory in this field.

Recent studies of innovation have focused particularly on the "gaps" at the lower end of the scale represented in Table 1 and especially on the implementation process within organizations and more complex social structures. Yin (1978), for example, has proposed that innovations do not become fully integrated into receiving social systems until they have been somehow ferried through what he calls the "passages" which mark true institutional acceptance (analogous to the "rites of passage" that cultures establish for the introduction of youth into the status of adult membership). Examples of such organizational "passages" include becoming a part of the regular budget (line item), having designated and accepted roles and rules governing procedures, and having established mechanisms for training and recruiting staff and replenishing materials. He also suggests that an important indicator of routinization is the survival of the innovation more or less intact through the periodic "cycles" that tend to mark institutional life, typically annual cycles. Studies by Yin as well as those by Berman and McLaughlin (1978) on the implementation of major educational innovation efforts have added to our understanding of the range of innovation problems that can be encountered.

In summary, there is demonstrably, a significant body of literature, much of it firmly grounded in empirical research studies, which can and should be brought to bear on the problem of innovation diffusion and utilization in the library field.

1.5 Current Knowledge of Planned Diffusion and Utilization Efforts: Campaigns, Services, Systems, and Networks

The state of current knowledge regarding diffusion and utilization goes well beyond academic description and analysis and extends to the evaluation of a number of active and planned interventions to improve diffusion and utilization using existing knowledge. Various mechanisms have been developed by the National Institutes of Health, the National Science Foundation (particularly under its now merged section, "Research Applied to National Needs"), the National Institute of Mental Health, various international development agencies (World Bank, UN Development Program, Unesco). Most of these experiments and experiences have received some kind of scientific evaluation which has then been reported in the literature. Many of these efforts come under the headings of "campaigns" (usually involving one prominent innovation or need area and a configuration of media, change agents, resources and other supports), "services" (involving an area of need or a range of innovations but limited to a particular knowledge transfer function), "systems" (providing a more comprehensive range of functions, often centralized), and "networks" (involving system configurations which include knowledge developers, communicators, and user institutions, usually in a decentralized array).

Some of the most significant studies of these planned efforts have appeared recently pertaining to planned efforts in the field of education. Dissemination strategies used in education have ranged from promoting access to research knowledge through the Educational Resources Information Center (ERIC), to interpersonal assistance in the adoption of new practices exemplified by the National Diffusion Network (NDN), to product marketing using private sector publishers, an approach fostered by the Office of Special Education. Other programs offer additional examples of different dissemination strategies, with the whole constituting what has been called a significant "unplanned (but nonetheless invaluable) variation experiment" in education.

Many of the dissemination strategies in education have relied on some kind of in-person assistance either from formal external facilitators such as Developer/Demonstrators and State Facilitators of the National Diffusion Network or from assisters located inside the adopting organizations. Perhaps the major finding of research regarding dissemination is that inperson assistance is critical to (1) making sites aware of innovations that are more complex than a product such as a manual; (2) helping sites to choose among innovations, make the right match or identify needs; (3) assisting with the specifics of implementation, that is, the working through of the innovation in its new environment; and (4) promoting evaluation, institutionalization, and secondary diffusion efforts. One aspect of the study of innovation is the emphasis on innovation characteristics. Various researchers have created ways to classify innovations according to their implementation requirements and the number and type of components they include.

Interpersonal dissemination strategies in education such as the National Diffusion Network (NDN) have developed a highly successful set of rules and activities aimed at achieving the spread and adoption of innovations. The NDN, for example, uses two different kinds of assisters to help local sites during their improvement efforts: Developer/Demonstrators are individuals who have created practices which are screened through a formal evaluation process, and are funded by the NDN to travel nationwide to promote their practices and train adopting sites in their use. State

Facilitators are assigned to individual states and work with local sites to help assess needs and make the best match from the pool of validated practices.

Research studies on the NDN have specified a series of activities that are important in awareness, adoption, and implementation efforts. These can be used to think about possible appropriate activities to deal with library and information sciences.

The NDN represents an obviously relevant precedent and a resource for contemplating planned interventions in the library field but it is not put forward here nor should it be considered as "the model" to follow. Rather it provides useful lessons, along with the many other planned efforts which have been studied, which can help guide models uniquely adapted to the circumstances of the library field.

1.6 Project Description

The purpose of this research on the diffusion of innovations in library and information services was to study:

- when and why innovation occurs in the library and information field,
- what linkages (communication channels) exist that result in a flow (dissemination) of information,
- what model(s) and methods were effectively used in the diffusion process, and
- what options and recommendations are needed to develop a plan for diffusion networks for library innovation.

Based on our understanding of the key issues, as described above, our approach to the proposed project was to follow a planned sequence of activities beginning with the identification of innovations to be considered and going on through several aspects of data collection to the development of a model for planned diffusion and associated recommendations for networking. This process was supported by a project Advisory Committee selected for their experience with, and understanding of, library innovations and the diffusion process.

SECTION 2

A MODEL FOR UNDERSTANDING DIFFUSION AND UTILIZATION IN THE LIBRARY AND INFORMATION SCIENCE FIELD

2.1 Introduction

The development of a model of diffusion in the library field is a key component of this study. The model should serve, on the one hand, as a guide to understanding critical issues in the process, and simultaneously as a kind of blueprint for yet-to-be-developed planned diffusion efforts on the other. Thus it must be both descriptive and prescriptive. In addition, the model should point the way to specific constructive actions that can be taken by library professionals at any level to improve the practice of their profession and the workings of the individual libraries and library schools in which they work. This is clearly no small task, but it is possible within the constraints of this project, provided that it is recognized that even after literature review, data collection and analysis the model emerging from this project will only be a tentative one which will have to be further validated and tested in practice in future projects. It may further be that the construction of one unitary model to serve these somewhat different purposes and audiences will be an elusive task. Rather, we may have to come down to alternative (but related) models to define, for example, what would-be promoters and diffusers should do and what would-be user-adopters should do when confronted with an array of innovation possibilities being promoted by different vendors with different strategies and interests.

A number of different diffusion models exist for other areas of study. Havelock originally proposed (1969) three alternative and somewhat competing models of change which he referred to as "diffusion" (or "social interaction"), "problem-solver" (user-system initiated change in response to felt need) and "R,D,&D" (research, development, diffusion, that is, systematic, scientific, and centralized change abetted by linear programming and systems analysis). The "linkage model" was an attempt to find a middle ground among these competing views of the change process, particularly reconciling the notions of individual problem-solving and adoption of new ideas through the influences and pressures of a social network.

In his latest work, Rogers (1983) takes note of the fact that there has been a significant divergence among diffusion theorists in recent years with respect to "centralized" versus "decentralized" models. Schon (1971) among others has criticized what he calls "classical diffusion theory" because of its implicit assumption that innovation emanates from only one source. For many types of innovation activity, in fact, he points out that there may be many sources of variants, adaptations, and alternative approaches to the same problem. These different innovations impact one another and compete with one another in a very complex pattern hardly captured by the classical model.

A number of other authors have criticized the empirical basis of classical diffusion theory. For example, Downs and Mohr (1976) claim that findings are so fragmented that an adequate general theory of diffusion is still not demonstrated. Various authors have also noted that special considerations arise in certain types of social systems such as industrial firms and public bureaucracies which make the diffusion process fundamentally different from those cases and studies most often cited by mainstream diffusion researchers. Lambright and Flynn (1977) and Yin, et al. (1977) propose that within governmental bureaucracies innovation adoption is governed both by rational cost/benefit or productivity decisions and by bureaucratic self-interest, i.e., whether adoption enhances or consolidates individual or group power for the adopter within the larger hierarchical complex. Feller (1982) has recently noted some commonalities in diffusion processes within public bureaucracies, characterizing the web of regulations and provisions surrounding innovation efforts as follows:

> "In the public sector, comprised of an intergovernmental system in which the purchases by a local government may be underwritten by federal or state governments, an elaborate set of approvals and certifications is often required before the local government user is in a position to secure funds to adopt an innovation" (p. 283)

Various authors including Rogers and Shoemaker (1971) and Zaltman, et al. (1973) have proposed that innovation diffusion can be substantially affected by the degree of centralized authority directed towards innovation adoption. Thus, innovations which are mandated in an authoritarian system may diffuse rapidly because of the coercive power of the leadership, but in such systems adaptive innovation and invention will be greatly inhibited.

These various threads of criticism and amendment to the "classical" diffusion model suggest at least four alternative model types which might have special relevance to library and information-related innovation diffusion. These could be characterized as (1) voluntary spread of a unitary innovation within a peer network (closest to the classical model); (2) multiple adaptive innovation and information spread within a peer network; (3) diffusion under mandate; and (4) diffusion in bureaucratic milieus.

Model #1: Voluntary Spread of a Unitary Innovation

This model makes the following assumptions:

- the innovation is a clearly delineated product or practice which initially enters the user environment from one and only one source and represents something new to all potential adopters;
- the population of potential users or adopters constitutes a social network of more or less similar and equal peer units, whether these "units" be persons, families, villages, organizations, or other social aggregates;
- the choice of adoption or non-adoption of the innovation in question represents a decision by each unit which is entirely voluntary in the sense that no outside persons or groups constrain the choice directly through mandates, conditional subsidies, etc. A great number of diffusion research studies in the past have been predicated on such assumptions including most of those conducted on the adoption of farm practices, the adoption of various practices by independent public school districts in the United States, the adoption of family planning practices and products in various developing countries, the adoption of new drugs by physicians in a given community, and many other instances in many fields too numerous to mention.

This model has some relevance to the field of library innovation spread to the extent that the assumptions are pertinent, as they are in many instances and for some innovations. For example, with regard to the item being available from one source, e.g., a publisher, many if not most individual librarians and information service directors will have a considerable free range of choice, unconstrained by superiors, by organizational rules, or by budgets if the cost is moderate. In making such choices dominant influences are likely to be fellow professionals in the library field coupled with a perception of one's own needs and the needs of one's clients as they are affected by the marketing efforts of the publisher. However, these are low impact innovations which at most have a very gradual incremental effect on the library system. As we move to more complex, more technologically sophisticated, more costly, and more competitive innovations the fabric of influence and decision-making becomes more complicated, requiring us to move on to models of diffusion which are also more complex. It is probable that many of the same social networking influences and decision influences are still present in more complex innovation situations but their effects are filtered and conditioned by other factors.

Model #2: Multiple Adaptive Innovation Spread

This model makes the following assumptions:

- the "innovation" is not a unitary product which enters the social network at a given point but rather it is a concept or cluster of concepts about how the system might be improved which might take on very different forms in different settings. Thus, each innovator is also something of an inventor, and even when one is borrowing the concept from elsewhere there remains considerable range for adaptation to local circumstances, needs and predilections;

- the population of potential users or adopters constitutes a social network of more-or-less equals as in model #1 although, the adaptability and diffuseness of the innovation allow for meaningful discourse among potential adopters with widely differing circumstances;

- the choice among alternatives is mostly under the control of the adopter (as in model #1), and the discretionary range of the adopter increases to the degree that he or she can modify the innovation to conform to constraints imposed.

This model possibly has greater relevance to the library field for those innovations requiring changes in procedures and in the acquisition of technical systems and services. Many such innovations, especially in their early stages, will spring up at several places in somewhat different variants and word about each variant will eventually spread to other settings where adopters will be confronted with a complex set of choices, e.g., (1) to wait for further development (until the "bugs" are out); (2) to adopt system "A"; (3) to adopt system "B"; (4) to combine elements of "A" and "B" in some way; or (5) to adapt one or the other, adding new elements of one's own invention. As innovations become more widely dispersed and more thoroughly tested in different versions two trends are likely to shift the paradigm of diffusion back to model #1. These trends are (1) standardization, and (2) commercialization. Many innovations in libraries and information services ultimately require standardization. This applies obviously to indexing and cataloging rules and to service sharing arrangements of various kinds. It is inevitable that the more the standardization the less room there is for adaptation at the user end and probably the less freedom for the individual librarian to make an unconstrained choice. Commercialization may occur whenever the popularity of an item reaches a level where a potential market is created which is exploitable by a vendor. In general, to exploit a market the vendor must be able to provide a "package" to which it has some exclusive rights. Such packaging necessarily inhibits user adaptation and reinvention but there is typically a trade-off in terms of reduced risk, lower start-up cost and ease of acquisition.

Model #3: Diffusion under Mandate

A great many innovations in most societies are not adopted by free unconstrained decision-making among a population of equals but rather by the decision of one person or group imposed on another. For any innovation we have to ask: Where is the locus of decision-making? Are the decision-maker and the user-adopter different? If the answer is "yes" then an important assumption of both model #1 and model #2 is violated, and we probably have to think about a rather different kind of model. The assumptions are as follows:

- the innovation can be of any type, size or significance;

- the adopter system as a whole is organized into hierarchies in which lower levels take orders from or are governed by what is decided at higher levels;
- the choice of innovation is constrained by or dictated by persons other than those who will be the implementers or the users of the innovation.

For the library field there are undoubtedly some types of innovation decisions which fit into the mandating category. Most libraries are, in fact, hierarchies, and many are subordinate hierarchies, dependent for key resources and for policy direction on higher authorities which may contain no library professionals and have little comprehension or concern for library interests. Diffusion patterns in mandate situations may sometimes look like classical diffusion patterns if the mandating authorities, in effect, represent a dispersed network or quasi-equal peers. However, true adoption and implementation within each system will depend very heavily on the quality of the relationships within the system, especially between the leaders and those led, the nature and severity of sanctions, and the degree to which the innovation represents substantial difficulties for adopters.

Model #4: Diffusion in Bureaucratic Milieus

As noted earlier, a number of recent commentaries and case studies of change in urban bureaucracies point to another model of innovation diffusion and adoption which is bound by a complex of rules and regulations, some directed at the innovations themselves, some at the resources required to make adoption decisions. The bureaucratic model is like the mandate model in that hierarchies are assumed and decision constraints abound, but it is different from the mandate model in that the loci of decisions are multiple and choices are bound by rules which constrain all parties. The assumptions of the bureaucratic model are as follows:

- the innovation can be of any type but somehow requires the involvement of a number of persons and the allocation of resources which are bound by legal rules of disbursement;
- the adopter is a formal organization;

20

- the adoption decision-making power is diffused among several actors and authorities inside and outside the organization who are required to follow various formalized or legalized procedures in acquiring resources or in making decisions related to the innovation.

Since the majority of libraries are public institutions or agencies of government at some level, they are very likely to be bound by a number of bureaucratic rules which probably complicate and delay the diffusion process to a considerable extent. In this project it would therefore seem appropriate to consider the implications of this bureaucratic model, drawing implications for a model building effort from the studies of Feller, Lambright, and others cited above.

It would be possible to go on to cite other models of diffusion, for example, a purely economic model, but the four listed probably represent the major variants of most pertinence to libraries and information services. In this project we expect to draw on the insights derived from each of these perspectives in synthesis development and model construction.

In the development of a preliminary model of diffusion in libraries we identified seven major aspects to be addressed:

(1) The Characteristics of Adopting and Utilizing Persons and Systems

What are the special characteristics of library professionals as people that might facilitate or inhibit certain types of innovation? What characteristics of libraries as systems need to be taken into account, e.g., norms for receiving new knowledge, norms for problem-solving and decision-making, norms for innovating, and norms for internal and external communication? Furthermore, what are some key characteristics of the larger regional and nationwide networks that tie together libraries and library professionals? These are all questions which must be addressed in considering diffusion of any innovation in any social context.

(2) Characteristics of the Innovation

Every innovation has a unique profile of characteristics which to some extent determine its speed of diffusion, the persons and systems most likely to adopt, the channels most appropriate for communication, and so forth. Major characteristics which have been studied are: relative advantage, complexity, communicability, diversity, trialability, and compatibility with user needs and circumstances.

(3) Stages

A variety of models have been put forward by different researchers and theorists regarding the stages of innovation diffusion and utilization. Figure 1 (on p. 3) implies a sequence which encompasses both communicative and implementation aspects. "Stages" can be thought of in purely quantitative terms, e.g., the number of persons or units which have reached a certain level of adoption. They can also be thought of as states within the behavioral-cognitive space for the individual adopter, e.g., awareness, interest, acceptance, acquisition, utilization. They can be further considered in an organizational context as stages of readiness and use by the organization as a whole or the social system which is the presumed target of change. Stages can also be thought about from the perspective of the persons or agencies who undertake planned diffusion efforts or the perspective of potential adopters.

(4) Appropriate Channels and Media Effectiveness

There are many studies pointing to the relative effectiveness of different media and combinations of media for particular users, particular innovations, and particular stages of the diffusion process. Generally, an effective strategy must incorporate a variety of media and must balance interpersonal, print, and non-print channel emphases.

(5) The Roles of Specialized Change Agents, Intermediaries, and Advocates in the Diffusion-Utilization Process

Many studies have shown that effective innovation diffusion usually requires some active interventions by persons or agencies with special skills in communicating, and providing technical assistance of various kinds. Some persons are important merely by their strategic positions as opinion leaders or boundary-spanners while others function in their roles because they were specifically trained and instructed to fill certain functions. The full range of such roles needs to be considered in laying out the context and in preparing viable models and networks for diffusion. The need for various roles is also known to vary by type of innovation, types of users, stages in the process, etc.

(6) Incentives

There is no one single issue more important than the provision of rewards or incentives for innovative effort. Both type and degree of reward will vary by type of innovation and stage in the process. Rewards have to be considered not only for users but for developers, disseminators, and the array of change agents discussed above.

(7) Alternative Theoretical Perspectives on Modelling Diffusion-Utilization

It is important at the outset to be reasonably eclectic in considering what theoretical frameworks work the best for understanding diffusion and utilization in the library context. In some ways an economic model of innovation makes more sense (e.g., Machlup) but political, social interaction, and problem-solving models are also worthy of consideration. Each perspective tends to add a dimension to our understanding of the whole.

2.2 A Preliminary Model of Diffusion and Utilization of Innovation in Libraries

In the development of a model of diffusion and utilization of innovations in libraries it is important to describe actual and potential constraints in both the diffusion and adoption of innovations. Aspects which must be addressed include, but are not limited to:

- The adoption/non-adoption of the innovation, its degree and timing in light of the variety of institutional missions,
- The degree of user resistance to/acceptance of innovation (both technological and non-technological) and the impact users may have upon the diffusion of innovation within library and information science to society as a whole, and
- The norms (within library types) of specific interinstitutional and interpersonal networks that exist for diffusion and adoption of innovation by library professionals within work settings.

For example, under the first aspect (institutional mission), library education programs have an implicit commitment to the diffusion of all innovation in the field for which sufficient explanations exist. This is not the case for specific types of libraries and related information agencies; their roles lie primarily within the adoption of innovation. (The role of libraries, etc. as "diffusers" is addressed under the third aspect.) The second aspect, user resistance/acceptance of innovation, can be regarded in terms of clientele. Age and educational background could quite possibly be factors in the acceptance of new ideas, as can be seen in the way that children as opposed to older adults (cf. school libraries) relate to changes in their environments and the speed at which they learn. Moreover, educational levels of users (cf. special libraries where highly technical information is frequently dealt with) may also play a part in the degree of sophistication users can bring to the diffusion process. The third aspect, interinstitutional and interpersonal networks for library professionals, may be quite difficult to describe. Here, the context of the library/information center within its parent institution comes into play — diffusion patterns for academic libraries within large research-oriented universities and special libraries within business corporations are different from those of other types of libraries, and innovations are often utilized in very different manners by their respective library professionals. Here, too, the relative degree of isolation of libraries and information centers from their sister institutions comes into play. The degree of prior adoption of innovation, especially communication technology, can significantly influence the library professionals' audience in terms of both being on the receiving and sending ends of diffusion. Interpersonal networks for diffusion of innovations are influenced by the library's context with its parent organization, its degree of isolation, as well as staffing configurations. However, professional interaction within the specific work environment, with sister institutions but, most importantly, within professional associations in connection with non-work professional activities provide a very important means of diffusion that we investigated in great detail.

Based on our review of existing diffusion and utilization models and on the review of literature concerning diffusion of innovations in libraries, a preliminary model was developed as displayed in Figure 2. This model identifies three basic input variables that influence the adoption process:

- Characteristics of libraries and librarians
- Characteristics of the social networks within which libraries and librarians operate
- Characteristics of innovations

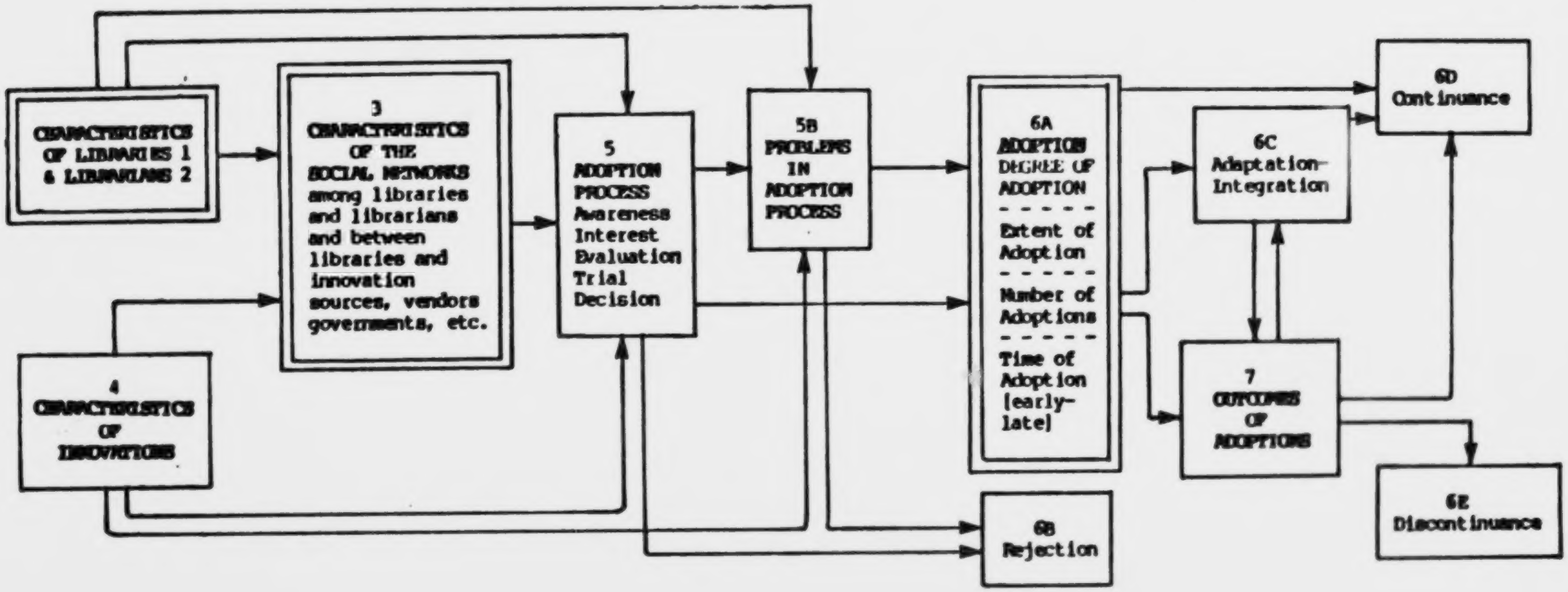
Outputs of the adoption process include:

- Problems in the adoption process
- Adoption
- Rejection
- Adaptation/Integration
- Outcomes of adoption
- Continuance or Discontinuance

This general model of diffusion of innovations in libraries formed the basis for data collection via case studies. The major input variables to the adoption process were analyzed in the context of libraries, librarians and their environments and a series of hypotheses posed as a framework for developing data collection instruments.

FIGURE 2

HYPOTHETICAL GENERAL MODEL OF LIBRARY INNOVATION DIFFUSION


CHARACTERISTICS OF LIBRARIES 1 & LIBRARIANS 2
3 CHARACTERISTICS OF THE SOCIAL NETWORKS among libraries and librarians and between libraries and innovation sources, vendors governments, etc.
4 CHARACTERISTICS OF INNOVATIONS
5 ADOPTION PROCESS Awareness Interest Evaluation Trial Decision
5B PROBLEMS IN ADOPTION PROCESS
6A ADOPTION DEGREE OF ADOPTION
Extent of Adoption
Number of Adoptions
Time of Adoption [early-late]
6B Rejection
6C Adaptation-Integration
6D Continuance
7 OUTCOMES OF ADOPTIONS
6E Discontinuance

—— = Independent variables, ═══ = Dependent variables.

2.2.1 Key Characteristics of Libraries and Library Professionals as Innovation Adopters and Users

2.2.1.1 Libraries as Adopting Systems

1. Structure/Hierarchy

Libraries, on the whole, are organized into two major divisions: Technical Services and Public/User Services. Technical Services divisions typically include such functions as acquisitions, cataloging, physical processing and circulation. Public or User Service divisions include the reference and referral functions, interlibrary loan, special programs, etc. In smaller libraries the structure is usually not as formal as distinct divisions but, nevertheless, does exist to some extent. In large and medium sized libraries each division will have a Division Head who reports to the Director of the Library. In larger libraries functions such as personnel, automated systems, finance and accounting, facilities and building management, may also be organized into separate units, each with a Head who reports to the Library Director.

The Library Director is usually accountable to the Library Board of Directors or Trustees for the overall performance of the library. However, the role of the Board itself can vary significantly from library to library. In some instances the Board performs an advisory role, in others a policy-making role, and in others can sometimes get involved in administrative matters.

Hypothesis 1: **The Library Director is the key decision-maker regarding the adoption of innovations.**

2. Finances and Budgets

The funding of libraries in the U.S. is extremely complex. Funding mechanisms vary substantially across types of libraries, and from library to library depending on the structure of the library and the nature of the relationships with governing bodies, parent organizations, etc.

Federal funds are provided to public libraries via the mechanism of the Library and Services Construction Act (1956). The public library programs are nearly all administered through the state library agencies. These funds have assisted the states in extending public library services to nearly every area of the nation and in improving access for various special groups, including the disadvantaged, the elderly, etc. Further, these funds have enhanced the ability of states to extend services through cooperative resource sharing and networking of libraries.

Federal funds for public libraries are available in three main categories:

Title I	(1)	to extend public library services to geographic areas and groups of persons without library services and to improve services in areas, and for groups that may have inadequate public library services.
	(2)	to establish, expand and operate programs and projects to provide library services to the disadvantaged, the state institutionalized, the physically handicapped, and those who have limited Englishspeaking ability.
	(3)	to improve and strengthen state library administrative agencies; strengthen metropolitan public libraries that serve as national or regional resource centers.
	(4)	to support and expand services of Major Urban Resource Libraries (MURLs).
Title II		for public library construction.
Title III		to encourage interlibrary cooperation among different types of libraries.
Title IV		to support library services for American Indian tribes and native Hawaiians.

Federal funds are also available for academic libraries under the Higher Education Act, which provides funds under these titles:

Title II-A	College Library Resources
Title II-B	Library Career Training and Library Research and Demonstration Program

Title II-C Strengthening Research Library Resources

Another source of federal funding is the Education Consolidation and Improvement Act (1981), Chapter 2. Among the programs consolidated by this Act is Title IV-B of the Elementary and Secondary Education Act, Instructional Materials and School Library Resources, under which school library media programs in public and private non-profit schools receive funding for purchasing instructional equipment and materials, textbooks and other school library resources.

Other sources of federal funds for library programs and library research are the National Endowment for the Humanities and the National Science Foundation, Division of Information Science and Technology.

Library funding sources also include state, county, and city governments through tax support and other appropriations. Private foundations are receiving increased requests for library funding. Special libraries, in private organizations are funded by their parent organizations. Association libraries are generally funded through subscriptions.

An ongoing controversy in the library world is the "charging for services" issue. Libraries are increasingly charging for some of their services, particularly services relying on technology, such as online literature searching or photocopying, and for services to individuals and groups or institutions other than their own constituents.

Hypothesis 2: Libraries with more funding will be earlier and more frequent innovation adopters.

Hypothesis 3: Libraries which have no more diverse funding sources will be earlier and more frequent innovation adopters.

3. Typical Patterns of Power Distribution

As mentioned earlier, libraries are run by a Director who usually reports to a Board of Directors. In the majority of cases it is the Library Director who makes key decisions and the Board reviews and approves them. However, in some cases when the Board takes on an advisory role the decisions are arrived at jointly by the Director and the Board.

Depending on the type of decision being made, library staff (notably Division Heads or their equivalent) will be included in the decision-making process. This is particularly important for decisions concerning innovations as it is usually the Division Heads, who, together with their staffs, will be responsible for implementing the innovations. Their involvement in decision-making should help to ease the acceptance and utilization of the innovations by staff.

Hypothesis 4: **In situations where library staff, in addition to the Director, are involved in the decision-making process, the adoption process runs more smoothly.**

4. Expectations Placed on Libraries that Might Inhibit Innovation

Although there is a general public view that libraries "are a good thing," libraries are often considered non-essential and luxury services when it comes to budget allocations. Much of this attitude towards libraries in all sectors of society is the lack of awareness of all the "behind-the-scenes" activity that occurs in libraries (such as selection and acquisitions of materials, cataloging, classification, physical processing of materials, preparation of programs and courses of instruction.)

Many people who use libraries use them in a very limited way. They tend to be unaware of the wide range of services that often are available. Thus many people view libraries as warehouses for books rather than as active information providers.

5. Expectations Placed on Libraries that Might Facilitate Innovation

While libraries are viewed by some as warehouses of books etc., there is a growing minority who see libraries as nodes in a wider information network providing access to the world's stores of recorded knowledge. This latter view is held by individuals who tend to exploit the services offered by libraries — particularly reference, referral and interlibrary loan services. In many cases these individuals have been exposed to online retrieval systems. Once used to looking beyond the walls of their own libraries they can see how other innovations would bring greater volumes of information within their grasps in shorter timeframes.

Hypothesis 5: **Libraries with a higher demand for more varied services are more likely to adopt innovations.**

Hypothesis 6: **Libraries that have adopted one innovation are much more likely to adopt successive innovations.**

2.2.2 Librarians as Innovators or Innovation Adopters

1. View of Own Role and Role of Library

1.1 Quality vs. User-Responsiveness

Two basic philosophies of librarianship demonstrate a spectrum of service options. On the one hand is the traditional view that libraries store and provide access to the best of all recorded knowledge by acquiring and maintaining "quality" collections. The assessment as to what constitutes a "quality collection" is left to the librarian. The opposite philosophy is much more recent in manifestation. It is based on the notion that a library should respond to the information demands of its users. Both of these viewpoints represent the extremes and many intermediate positions exist. However, it can be hypothesized that the latter philosophy is more innovative (i.e., nontraditional) in the library world.

Hypothesis 7: **Libraries with a user-responsive view of their role will be more innovative than those with a quality view.**

1.2 Active-Reactive

Some librarians are essentially reactive — providing the appropriate information when it is requested. Others are much more proactive and actually market library products and services.

Hypothesis 8: Libraries and librarians with a proactive orientation to service will be more innovative than those with a reactive orientation.

2. Education and Training

In most areas of librarianship the required entry level qualification is the Master of Library Science (MLS) degree. The exception to this is the area of school librarianship where, in some states, a bachelor's degree in education with certification in librarianship will suffice, although in some states a "double masters" is required (MLS and M.Ed). The majority of librarians possess bachelor's degrees in Arts and Humanities subjects although some individuals do move into librarianship from science and engineering. In special and academic libraries these subject backgrounds play an increasingly important role in the provision of effective library services.

Public librarians and school librarians may need state certification to practice in certain states. The requirements for certification, however, vary dramatically from state to state, ranging from a minimal number of undergraduate credit hours in library science to an ALA-accredited MLS. Some states also require recertification at regular intervals, again with differing requirements.

The quality of library education is gauged to some extent via the accreditation process. The accrediting body for library schools in the U.S. and Canada is the American Library Association (ALA). The accreditation process involves an intensive self-study conducted by the school seeking accreditation, and an evaluation of the school, its programs, resources, etc., by a Site Visit Team appointed by ALA's Committee on Accreditation. Accredited programs, once approved, must be reviewed every 7 years for continuing accreditation.

Hypothesis 9: Libraries with higher levels of staff education in librarianship will be more innovative.

Hypothesis 10: Graduates from ALA-accredited programs are more open-minded towards innovation than graduates from other programs.

Hypothesis 11: Libraries whose directors have recently graduated from higher degree programs in library science will be more innovative.

A recently completed study of competency requirements of librarians and other information professionals (Griffiths and King, 1986) has demonstrated the need for educational programs to provide more emphasis on:

- information technology
- information management techniques
- marketing of information services and products
- evaluation of information systems, services and products.

It would appear, therefore, that individuals having exposure to the topics above as part of their library education will be more adequately prepared to deal with the actualities of the job.

Hypothesis 12: Librarians whose education included courses related to information technology, information mangement techniques, marketing of information services and products, or evaluation of information systems, services and products, will be more open towards innovation than others.

3. Prominent/Typical Personality Traits which Might Affect Innovation

There is substantial evidence that personality plays a considerable part in occupational choice. People tend to select a work environment that is consistent with their personality traits. Vocational psychologists have developed a number of methods to study and describe the relationship between personality and occupational choice. One typology — of personalities versus occupations, Holland's typology, placed librarians in the Conventional category along with bank tellers, bookkeepers, traffic managers and court stenographers, although this was later shown to be incorrect. A study of librarian personality traits using several different inventories — SVIB (which measures interests); California Psychological Inventory, CPI, which is concerned with personality assessment via questions of value; and the Adjective Check List (ACL) which is concerned with personality assessment via adjectives, indicated that:

> "the librarian is from the middle to upper-middle class, is intelligent and probably majored in the humanities in undergraduate school. The librarian's interests are cultural, aesthetic, and artistic. The librarian places a high value on self-respect, freedom (independence and freedom of choice), inner harmony (freedom from inner conflict), and wisdom (a mature understanding of life). The librarian is not motivated by extrinsic rewards such as money, power, and prestige but by inner rewards such as self-respect, achievement, and inner peace. The librarian is well adjusted, is optimistic, and has a positive attitude toward life. The librarian is neither an introvert nor an extrovert. The librarian has self-understanding, understands others, and is interested in and supportive of them; the librarian has little need to engage in behaviors that attack or hurt others. The librarian's capacity to form relationships with the same and with the opposite sex does not differ from that of people in general. The librarian is responsible and conscientious, practical and persistent. The librarian is self-controlled and orderly, prefers stability in everyday life, and dislikes risky, undefined situations. The librarian is tolerant and non-authoritarian. And, finally, the librarian has high achievement needs, which proably can be met through cooperative activities and a suitable environment."

This description of the typical librarian would inhibit innovation if innovations were considered risky.

In a study of resistance to technological innovations in libraries (Fine, 1979) the most significant correlates of resistance were those related to attitudes that technology (1) will result in loss of control and privacy, (2) will erode interpersonal relationships, (3) will replace people in their jobs and (4) will replace formalities, traditional and useful library processes. However, no significant relationship between personality variables and a "resistance index" could be identified.

Similarly, little correlation was found between resistance and occupational or professional variables. However, further analysis revealed that in considering occupational and professional variables, higher levels of resistance are associated with restrictive supervision. The study also confirmed the perception that librarians have of the decision-making processes in their own libraries. Generally most librarians interviewed (over 68%) felt that they were removed from the decision-making process which was conducted with higher levels of administration.

The major conclusion of this study was that no personality was identified that is inherently resistant to change. Rather, resistance emerged as a phenomenon strongly dependent on the environment in which an innovation is proposed. An individual's perception of his/her impact on decision-making in the organization was related to the tendency to be resistant. It appears that the personality of individual librarians need not be viewed as a constraint to innovation. On the other hand, the organizational climate and the style in which innovation is proposed is subject to redefinition and is, therefore, an appropriate target for change strategy.

Another conclusion of the study is that resistance can be disguised and at least its overt manifestations suppressed. The results suggest that the tendency toward professional conformity will obscure and distort the expression of resistance. A final implication of the findings is that resistance to an innovation may originate in reaction to the agents of change and then be misdirected to the innovation itself.

These studies not only raise several questions but also provide some answers. Are the personality traits of the decision-makers important in the adoption of innovations? Are librarians who are involved in cooperative activities (within and among libraries) resistant to innovations? Are librarians in environments where they are closely supervised less innovative than others in less restrictive environments?

Hypothesis 13: Decision-makers who consider themselves creative, go-getters, doers, etc., are more innovative than those who do not.

Hypothesis 14: Decision-makers who are perceived (by their staffs) to be creative, go-getters, doers, etc., are more innovative and meet less resistance than others.

Hypothesis 15: In libraries where staff supervision is closely controlled, there will be more resistance to innovations.

Hypothesis 16: Librarians who are involved, directly or indirectly, in cooperative activities are more open towards innovations.

4. Other Characteristics

Librarianship is a female-dominated profession. Like other professions that are not female-dominated, male librarians' salaries tend to be higher than female librarians' salaries. This salary inequality tends to exist in both kinds of cases: men are paid more when performing at the same level (job title, duties) as women, and men are disproportionately represented in the higher levels of librarianship: management, administration, department head, etc.

Some research on the career patterns of librarians investigates job mobility as a factor relating to salary differentials. One such study by Braunagel (1979) found that men and women changed jobs with similar frequency, but significant differences were found in their reasons. Men were much more likely to change jobs for career-related reasons, while women were much more likely to give personal or family reasons for changing jobs. Despite similar mobility rates, women were less likely than men to gain promotions when they changed jobs, which can be partially explained by their reasons for changing jobs.

Another study by Heim and Estabrook (1981) reported the results of research which attempted to characterize the overall career patterns of librarians. Five typical paths in this longitudinal study were examined: 1) same position in the same organization; 2) similar position(s) in the same organization; 3) different position(s) in the same organization; 4) similar positions in different organizations; and 5) different positions in different organizations. Similar to career ladders in other professions, the largest group of respondents of both sexes had held different positions in different organizations.

Unfortunately, Heim and Estabrook do not break down this fifth category into two subcategories: a) holding different positions in different organizations that are the same type of library (school, public, academic, special, etc.) and b) holding different positions in different organizations that are also different types of libraries. From the Library Human Resources Study (Roderer, et al., 1983), we know that mobility between types of libraries is variable, and that when respondents indicated a job change during the time period studied, more went to the same type of library (e.g., from one school library to another school library) than to a different type of library. If this can be considered true over time for the profession as a whole, it has distinct implications for the supply and demand balance of librarians: approximately one half of all librarians are currently employed in school libraries where little growth is projected as opposed to, for example, the projected growth in special librarian employment.

Hypothesis 17: Librarians who have held positions in different organizations are likely to be less resistant to change than other librarians.

Hypothesis 18: Librarians who have held positions (similar or different) in different types of libraries are likely to be less resistant to change than all other librarians.

Hypothesis 19: Librarians who have held the same position in the same organization (those without a job change) are likely to be more resistant to change than all other librarians.

2.3 Characteristics of the Social Network Which Connects Libraries to Innovation Producers and Vendors

1. Libraries as participants in networks

Library networks have come of age in the last fifteen years or so, and are very prevalent. It is not uncommon for libraries to be members of more than one network, each of which has a different function, operates at a different level, etc. Networks exist for a multitude of purposes — shared cataloging, interlibrary loan, etc., and at a variety of levels: state, regional, national, and indistinct combinations along this continuum. A result of the need to share resources coupled with decreasing technological costs is that many networks are automated and provide a means by which libraries of different types (school, public, academic, federal, special, etc.) can cooperate, as well as a means by which geographically dispersed libraries can communicate.

Hypothesis 20: **Libraries that are members of, or are in close geographic proximity to members of, networks are more likely to be aware of resource sharing innovations than those that are not.**

Hypothesis 21: **Libraries and librarians who belong to more networks will be more innovative.**

Hypothesis 22: **Libraries and librarians who have belonged to networks longer and/or have more influential positions in these networks will be more innovative.**

2. Major membership organizations and associations

Another channel for much communication in the profession is via professional organizations. The largest of these is the American Library Association (ALA). Combined individual and organizational membership is well above 35,000. As perhaps the most generic library-related professional association in the U.S., it can be regarded as a model and source of guidance for activities by some of the other associations. Having numerous divisions functioning as associations in their own right e.g., American Association of School Libraries (AASL), Public Library Association (PLA), ALA also is affiliated with and cooperates with many other professional associations. Some of these other associations are geared to type of library and are also fairly large, for example Special Libraries Association (membership exceeds 11,000) and Association of Research Libraries (approximately 43 libraries). Still additional organizations exist that are dedicated to the subject of the library's collection - e.g., Music Library Association, Theatre Library Association, etc. These subject-oriented associations tend to be smaller in size and highly specialized in purpose.

It is quite common for a library or librarian to be a member of more than one professional association, for a variety of reasons. The larger associations provide information of a more general, national nature, while the smaller ones provide a forum for discussing special interest topics, as well as reputation building. The larger associations are also more apt to sponsor a variety of continuing education activities, hands-on workshops and exhibitions, as well as retaining a list of resource persons by areas of expertise.

Hypothesis 23: Library and information science professionals who are members of a professional society are more likely to be innovative than those who are not.

3. Important Meetings

Many of these organizations hold annual conferences at the national level. Some, like ALA and the American Society for Information Science (ASIS), also hold less formal mid-year meetings. Many regional and state-level library associations also hold periodic meetings and annual conferences. In general, the annual conferences of the larger, more general organizations tend to be the more important meetings. However, some of ALA's divisions that are also associations now also hold conferences (e.g., AASL, PLA, LITA) that are of growing importance, partially because of the rising costs associated with the national conferences. Furthermore, other professional organizations not limited in membership to libraries or librarians hold annual meetings that are of major importance in the diffusion of certain kinds of innovations, for example, the National Online Meeting.

Hypothesis 24: **Librarians who have attended major professional association conferences or meetings are more likely to be innovative.**

Hypothesis 25: **Librarians who have attended more major professional society meetings or conferences themselves or who are employed in a setting in which other professionals have attended such meetings are more likely to be innovative.**

Hypothesis 26: **Professional society members who regularly attend major society meetings or conferences are more likely to be innovative.**

4. National Leadership

The national leadership for U.S. libraries can perhaps be regarded as somewhat ill-defined and diffuse. The National Commission for Libraries and Information Services (NCLIS), a government agency over ten years old, is run by a federally-appointed commissioner and can be viewed in a titular sense as the leadership for the profession. The actual leadership in the profession is more closely centered on a few of the major national associations (ALA, SLA, etc.), state libraries (COSLA), and on certain large libraries (Library of Congress, major research libraries) for matters of practice in the field. The degree of influence of the national leadership is much more pronounced in matters of practice; in other cases, influence remains at a generalized national level regarding political developments until legislation is passed, defeated, or modified.

Hypothesis 27: **Individual libraries are more likely to confer with each other before going to government for other-than-funding assistance in dealing with innovation (i.e., they are unlikely to direct initial first appeals and calls for suggestions at local government, state library agencies, the Department of Education, etc.).**

5. Role of Government

Government plays a mixed role in the diffusion and adoption of innovation in libraries and information centers. The major role of the federal government is, of course, funding. However, all levels of government appear to have recognized the need to maximize resource sharing in libraries, be they actual collection materials, services, equipment, or even facilities. At the state level, state library agencies administer LSCA funds, often through visiting coordinators who also provide technical assistance. At the local level, municipalities appear to be recognizing the importance of library services and look to facilitate the continued health and existence of library services without additional funds. This economic pinch sometimes leads to "innovative" solutions at the local level - circuit rider librarians, different types of libraries sharing facilities, reuse of abandoned public facilities instead of new construction, and the like.

Hypothesis 28: **Federal or national libraries contract with the private sector for matters other than networking, document delivery, database searching, and major research.**

Hypothesis 29: **Libraries are more likely to give a private sector produced innovation a trial period when it is available free of charge, at a reduced cost, or it has been adopted at a nearby library.**

Hypothesis 30: **The more perceived encouragement or pressure from government to adopt innovation, the more innovative libraries are.**

6. Role of the Private Sector

The private sector's role in producing and diffusing innovations in libraries and information centers is extremely important and likely to grow. Many of the innovations already developed have stemmed from the private sector, as it has a large market of organizations concerned with information — e.g., publishers, hardware and software manufacturers, database producers and vendors, private sector library networks, and so on.

Because it is not dependent upon public funds, the private sector is not nearly as constrained for money. Nor is it bound, by law or traditional practice, to the concept of "free" services/products. In the private sector, the portion that is large and growing is primarily concerned with communications. Its long history of both competition and cooperation has fostered the development and testing of innovations, especially technologically oriented ones. The private sector looks first to other members of the private sector for a market, with new developments tending to trickle down to libraries. Once adopted by major libraries, the spread of new development in libraries is facilitated. It is also not unusual for an innovation to be produced by one participant in the private sector, marketed for a while and then reviewed later to see if it has been adopted and substantively modified by another private sector participant for the library market. This is especially true for technologically oriented innovations.

Hypothesis 31: Libraries and librarians with greater exposure to commercial vendors will be more innovative.

7. Major library research and development institutions

The major library research and development institutions in the U.S. have changed somewhat in nature over time. Of course, the national libraries (National Agricultural Library, National Library of Medicine, and Library of Congress) have continued to retain this role and are instrumental in sponsoring R&D and interacting with private sector contractors in this regard. The U.S. Department of Education has a long history of sponsoring library and information science R&D, with other federal agencies also playing a similar role (e.g. National Science Foundation). Some of the major research libraries may also be regarded as research and development institutions (e.g. the "research branch" of the New York Public Library, certain university libraries, etc). Relative newcomers as R&D institutions are the major U.S. bibliographic utilities (OCLC, RLIN, and WLN). They are, not unexpectedly, concerned primarily with innovations that will extend and/or enhance their current services.

Private sector foundations are also important in sponsoring information-related research and development. One of the most important foundations is the Council on Library Resources (CLR) which initiates research on a variety of topics funded by grants both directly to libraries and funnelled through national and international organizations and societies. Other foundations, less obvious to the field, also play an important, if less direct role, (the Ford Foundation, Kellogg Foundation, for example). Private sector consulting firms have also played a major role in research and development in recent years (Cuadra Associates, Inc., Capital Systems Group, King Research, Inc.) in developing new methodologies for evaluating information services and designs for information systems, products and services.

In general, the common denominator of innovations in R&D institutions can be viewed as technological. Technology is applied to the major functions of networking/resource sharing, automation, and storage and retrieval of information.

In many cases in which the R&D institution cooperates with others or contracts out the research and development, ties to others are often established through the competitive bidding process. When major professional societies are involved, links to the library community are established via that society. However, in many cases, the level of awareness of the R&D as it is occurring by practitioners in libraries and information centers is relatively low. Completed research and development is frequently reported in the literature, but publication time lag can be significant.

The major library research and development institutions have a variety of linkages with library schools. Some offer internships, practicums, and the like (Library of Congress, National Library of Medicine). Others fund educational programs as part of their R&D activities: CLR has established the Professional Education and Training for Research Librarianship Program (PETREL) and the Department of Education funds fellowships under the Higher Education Act, Title II-B, Library Career Training. Still other institutions recognize the contributions their staffs can make to library education, with "double" appointments as adjunct faculty at library schools. Other organizations have established "exchange" programs, whereby experts (not limited to library school faculty and students) can take a sabbatical from their current jobs to work on specialized research topics; an example is OCLC's Visiting Scholar Program.

Hypothesis 32: Libraries are more likely to adopt innovations in practice when the innovation has already been adopted by a major research or national library.

Hypothesis 33: Practitioners who have had internships, practicums, sabbaticals, etc., at major R&D institutions are more likely to be innovative than those who have not.

Hypothesis 34: Libraries which use private sector consultants will be more innovative.

8. Major Print Media in the Library Field

Several kinds of literature in the library field have a major role in the dissemination of research and major developments in the field, and therefore indirectly, increasing awareness of innovation. The first of these is the state-of-the-art review exemplified by the *Annual Review of Information Science and Technology* (ARIST). Other generalized reports of activities in the library and information science field are found in serial monographs such as the *ALA Yearbook* and *The Bowker Annual of Library and Book Trade Information*. Publications of these kinds have large audiences; however, the information they provide often suffers from a lack of timeliness due to the infrequency of publication and the national/international scope.

Far more important as carriers of information on innovation in library and information science are conference proceedings, technical reports, and journals. However, bibliographic access to and availability of conference proceedings and technical reports tend to be limited when compared with that of the journal literature. For this reason, journals function as perhaps the main channel for disseminating information about innovations. This channel is less heavily based on primary research journals than in other fields and includes, as an important component, professional society organs (that may, in some cases, also function as primary research journals — for example, Journal of the American Society for Information Science). Those journals received as part of membership benefits in a society, especially large societies, tend to have large readerships that exceed the circulation as many organizational members are in fact libraries (as opposed to individuals), and the library copy of a journal may be read by many employees, whether they are members of the society or not. In addition to professional society-published journals, "stand-alone" journals also play an important role. There is a significant influx of new titles in the field, especially those relating to automation and technology and library management issues. Newsletters and bulletins, are often also published by professional societies, despite their ephemeral nature and reduced circulation when compared with journals, their frequency of publication. They are more likely to carry "news flashes" and short reports of research in progress.

Popular journals and scholarly journals in other, related fields must, however, not be overlooked. In that innovations in library and information science frequently do not originate within the strict confines of this field, they are often described first in the literature of other fields. Both the popular and technical literature of the computer science field are important sources of information, as is that of the publishing industry and other communications-related fields. Readership of this type of literature by library and information professionals is somewhat limited, especially for the more technical computer science journals. Still, experts and those who have a desire to stay abreast of new innovations avail themselves of this literature.

Hypothesis 35: Librarians who spend more time reading library and information science journal literature will be more innovative.

Hypothesis 36: Experts, original adopters, and innovation producers are more likely to peruse journals of other fields for information on new developments and innovations than the general body of professionals and later adopters of innovation.

9. Professional Schools

The primary source for education of library and information science professionals in the United States is the "library school". Situated at colleges and universities, some 98 schools exist. Sixty-eight of these provide first professional degree programs (at the Master's degree level) accredited by the American Library Association. The remaining thirty schools provide a variety of programs from the Master's degree in Library Science, preparation for careers as school librarians, to undergraduate library science coursework, etc. For some time, the Master's degree in library science has constituted entry level preparation for employment, with considerable emphasis on graduation from an ALA-accredited program. However, many schools offer doctoral programs and sixth year certificates, and a small number of schools are establishing or considering new Bachelor's degree programs in Information Science or Information Management. Enrollment in Master's degree programs in library science has declined over the last ten years, but the combined output of these programs numbered approximately 5,000 in 1981. Students have traditionally been liberal arts and humanities graduates of four-year colleges and universities, but this may change as students with scientific backgrounds are recruited to satisfy employment demands.

Library school faculty devote substantial portions of their time to research and often act as library consultants. However, much of their research can be said to be highly personalized and not directly leading to the production of innovation. On the other hand, faculty must remain aware of new developments in the field, especially innovations relating to practice, so they can present as current as possible a picture of actual professional practice and changes likely to occur.

In addition to faculty research, library schools frequently attempt to specialize in certain areas (e.g., information science, medical librarianship, rural librarianship, service to the handicapped), with faculty strengths and research often falling into these areas. In this way, too, they compete with each other for students. Some library schools have the reputation for being educational innovators as a result of their departures from traditional curricula or methods. Other schools have limited the specializations and programs they offer in order to cater to a small, but steady number of students.

Competition among library schools is fairly strong, and is not limited to competition over potential enrollments. On matters of approach toward educating library and information professionals, they differ on what should be taught, how it should be taught, and so on. Library schools are also very unevenly distributed throughout the United States, with some states having none and some having as many as five. In the states and regions where library schools are plentiful, competition for students is heightened. On the other hand, contacts with libraries and other information agencies are more plentiful due to the need to establish internships and place graduates.

Hypothesis 37: Libraries which use consultants from library schools will be more innovative.

Hypothesis 38: Librarians who stay in contact with library school faculty will be more innovative.

Hypothesis 39: Libraries in closer proximity to library schools will be more innovative.

Hypothesis 40: Librarians who encourage their staff to take continuing education courses at library schools will be more innovative.

10. Specialized Mechanisms

Specialized mechanisms to promote innovation awareness, diffusion, and use that have been established with these purposes in mind are few in the library and information science field. Mechanisms established for other purposes, however, do play a part in the dissemination of innovations. For example, the ERIC Information Resources Clearinghouse at Syracuse University collects, abstracts and indexes literature about research in library and information science. In this way, it contributes to the diffusion of innovations. In addition, non-bibliographic networks exist, many of which function like clearinghouses and provide needed technical assistance. The role of state library agencies as a conduit for disseminating relevant general information to all types of libraries in the state is beginning to show increased importance, especially with regard to information on fruitful directions and techniques for interlibrary cooperation. Many networks and state library agencies are members of the Association of Specialized and Cooperative Library Agencies (ASCLA), an ALA division. In this way they can channel relevant information through professional association channels.

11. Other Features of the Social Network

Perhaps the most important node in the innovation communications network in the library and information services field is that of professional societies and associations. As a link to other associations, individual libraries, professionals, all levels of government, foundations, vendors, publishers, and the like, professional associations provide information on a variety of topics in a number of ways. Through their journals they provide a forum for ideas; via conferences, a means of face-to-face exchange and an opportunity to witness demonstrations of library innovations. They also can be called upon to provide lists of experts and resource persons in a variety of areas. Furthermore, they are sources of information on professional education opportunities and programs, as well as offerors of continuing education activities.

2.4 Characteristics of Innovations in the Library Field as a Whole: 1960 - 1985

1. General Trends

In reviewing the literature on innovations in libraries and information centers, it becomes clear that the dominant innovations during the period 1960 - 1980 related to the application of computing and telecommunications technologies to the problems of handling information. It is easy to concentrate on these technological innovations alone as they are much more visible to the librarian than other, more esoteric types of innovations, such as the concept of charging for services. The technology-based innovations are visible because they usually have some equipment, or hardware associated with them. The software-related innovations -- integrated library systems, for example - are much more difficult to define as are new services and procedures.

We divided innovations into three categories based on the ultimate use of the innovation within a library or information center. The three categories are: Input/Storage, Output/Service and Management.

a. Input/Storage Innovations

This set of innovations includes the adoption of computer-based technologies and new procedures to support the input and storage operations of the library. They include:

- automated acquisitions
- automated serials control
- microfilm catalog
- AACR II adoption
- bibliographic utilities
- cable services
- multi-type networking
- automated cataloging
- preservation

These innovations have all served to facilitiate the processing of library materials from the time of selection until they are available to the users of the library. They can also support the identification, verification and location of needed materials.

The current trend in libraries is to adopt a combination of several of these innovations. For example, a library might be using AACR II for cataloging its materials, an automated library system supporting acquisitions and serials control, a bibliographic utility for cataloging purposes and for identification of libraries holding required materials for interlibrary loan purposes. This situation is not common among libraries; nevertheless, the adoption of one innovation does seem to spur on the adoption of other innovations.

Hypothesis 41: **The adoption of the first innovation is a more difficult process than the adoption of subsequent innovations.**

b. Output/Service Innovations

This set of innovations relates to services provided directly to users - reference, referral, etc. Included are:

- online catalog
- online seaching
- automated circulation
- satellite communication
- computer access for patrons
- charges for services
- pathfinders
- community information and referral services

The main trend with this set of innovations is the expansion of services offered to library users. Users can today gain access to vast stores of information within a few minutes through online seaching systems. Within a library, pathfinders and online catalogs will assist a user to locate required materials, and automated circulation systems will indicate whether or not materials sought are on loan, in processing or on the shelf. Essentially all of these innovations (this particular set primarily, and the previous set secondarily) help to provide faster access to more information.

Accompanying some of those innovations needed directly for service provision to library users was the need to recover the costs of using some of the new, innovative vendor-supplied services. In most instances only the actual cost of using such services is recovered (such as the cost to search a database, and telecommunications costs for accessing a database) rather than total costs (which would include the cost of personnel, equipment, and supplies to operate the service within the library). This concept of charging users for certain library services (online database searching being most common, together with charges for interlibrary loans) is contrary to many librarians' perceptions that the role of a library is to provide free access to information and this has, in many cases, inhibited adoption of innovations.

Hypothesis 42: **The necessity to recover at least partial costs for operating some innovative services has inhibited the adoption of innovations.**

Hypothesis 43: **Innovations that are funded entirely through grant monies or that are fully budgeted items are adopted much more rapidly than innovations requiring some form of cost recovery.**

It is interesting to note that this set of output/service innovations, because of their direct application to user-related services, is altering people's perceptions of their libraries, and of libraries in general. Libraries that provide access to microcomputers for their patrons are perceived, by those patrons, as being forward-looking and at the state-of-the-art (even though they may be far from it). Such innovations can often result in increased funding for the library.

Hypothesis 44: **An output/service innovation if adopted first is much more likely to result in successive adoptions than an input/storage or a management innovation.**

c. Management Innovations

This set of innovations relates directly to the overall management of a library or information center and includes:

- planning process
- output/performance measures
- integrated library systems
- computer usage for management
- security systems

The trend in most libraries is to plan for and evaluate services. The extent to which libraries have adopted formalized procedures for planning and evaluation, however, is not known, although standard guidelines for both planning and evaluation have been published. Until very recently library managers experienced significant problems in keeping fully aware of the users of the library and library services, and of the efficiency and productivity of the library organization. Automation has provided library managers with a tool to facilitate both the gathering of statistics concerning use and operations, and their subsequent analysis.

Hypothesis 45: Adoption of management innovations lags behind input/storage and output/service innovations.

2. Research Base

The majority of innovations in the library field are innovations which have been developed elsewhere and transferred and tailored to library applications. Computer innovations are a good example of this. However, once an innovation has been identified as potentially applicable to libraries, there will be a considerable investment in research and development to customize the innovation to the field. In many disciplines such research and some of the development is conducted by university departments. This is often not the case with librarianship. Much of the research and development is conducted by the ultimate vendor of the innovation. Only a relatively small amount of R & D is conducted in the library schools. These R & D projects are generally funded through federal agencies (Department of Education, NSF, etc.), although there are some moves toward public-private sector joint ventures.

One unfortunate aspect of the development of customized innovations in the library field is the relatively small potential user base. Relatively few developers of innovations are attempting to satisfy the requirements of the entire user base. Many innovative products and services are announced too early. Consequently, many innovative services and products are adopted by libraries too soon in the development cycle with the result that performance of the innovation is unsatisfactory. This makes the adopters think twice about subsequent adoptions.

Hypothesis 46: In libraries where the first adoption of an innovation was unsuccessful (from the viewpoint of expectations vs. performance), subsequent adoptions are more difficult.

3. Benefits of Innovations

The various innovations that have been adopted by libraries since 1960 have benefited libraries in several ways. They have improved the efficiency of library operations by streamlining and formalizing procedures, eliminating redundant clerical effort, and processing large amounts of information more rapidly. Such improvements in efficiency have rarely led to reductions in staff but rather to a redistribution of staff to more user-oriented services from more process-oriented services.

The most significant benefit of the various innovations listed above is in the expansion of user services. Users can now gain access to much more information, in many more different forms, much more rapidly than before. Many of the innovations can be used to support resource sharing among libraries thereby alleviating space problems while simultaneously providing an expansion of the "collection" for library users' access.

Hypothesis 47: **Innovations with more substantial benefit to the library and its users will be adopted sooner.**

4. Costs to be Anticipated

Costs are considered to be negative benefits, or detriments. The main costs associated with innovations include the purchase/acquisition costs, maintenance costs, and operational costs. Moreover, some innovations incur an increased labor cost because either more personnel are needed to operate the innovation-based services, or more highly qualified personnel are needed. Training costs are nearly always incurred. In some instances special environments have to be created (e.g. static free computer rooms complete with air conditioning).

5. Benefits and Costs Realized to Date

While it may be relatively straightforward to elicit statements of benefits realized from innovations by various libraries, it is likely to be extremely difficult to elicit good cost data. Most frequently only purchase costs are recorded in detail, with other costs, such as space costs, utilities costs, and labor costs, not broken down in sufficient detail for an accurate costing of the innovation adoption, testing, and utilization.

Hypothesis 48: **Innovation adoption and diffusion will not be based on assessments of long-term operating costs and benefits.**

6. Divisibility/Trialability of Innovations

Innovations can, in many cases, be adopted separately although certain types of innovations lead to adoption of additional innovations. This is the case with automated innovations which, once the appropriate hardware is acquired, can be expanded through acquisition of additional software to support more services. The use of a bibliographic utility for the production of cataloging information leads one to consider using the utility for other services, such as interlibrary loan requesting, acquisitions processing, and/or to acquiring an in-house automated system to support catalog maintenance and circulation locally.

The set of innovations in the library field that are available on a trial basis without long term commitment is smaller. Typically, vendors of services (e.g. online databases) will offer trial periods at minimal costs. In most instances, libraries consider the adoption of innovations as an important decision which will have some positive impact on service provision.

Hypothesis 49: **Trialable innovations will be adopted sooner and more widely than those that are not.**

7. Change Implications

The major change that innovations have brought to libraries is in the nature of their service provision. Prior to 1960 many libraries offered "reactive information services", i.e., they responded to user requests for information. Innovations which led directly to service expansion, resulted in libraries becoming or finding the need to become much more proactive in their services through the use of various marketing strategies.

The other change that has occurred has been a shift in personnel requirements. On the one hand there has been a downgrading of certain types of jobs within a library to the paraprofessional level. On the other hand, the change in emphasis towards user services that are anticipatory and more sophisticated in nature has resulted in the need for more professional staff.

8. Compatibility

Most of the innovations referred to in this report are compatible with the viewpoint that libraries are becoming active nodes in large-scale national and international information networks. However, many of the available innovations are not supportive of that view and do nothing to facilitate interaction among libraries using different manifestations of the same underlying innovation.

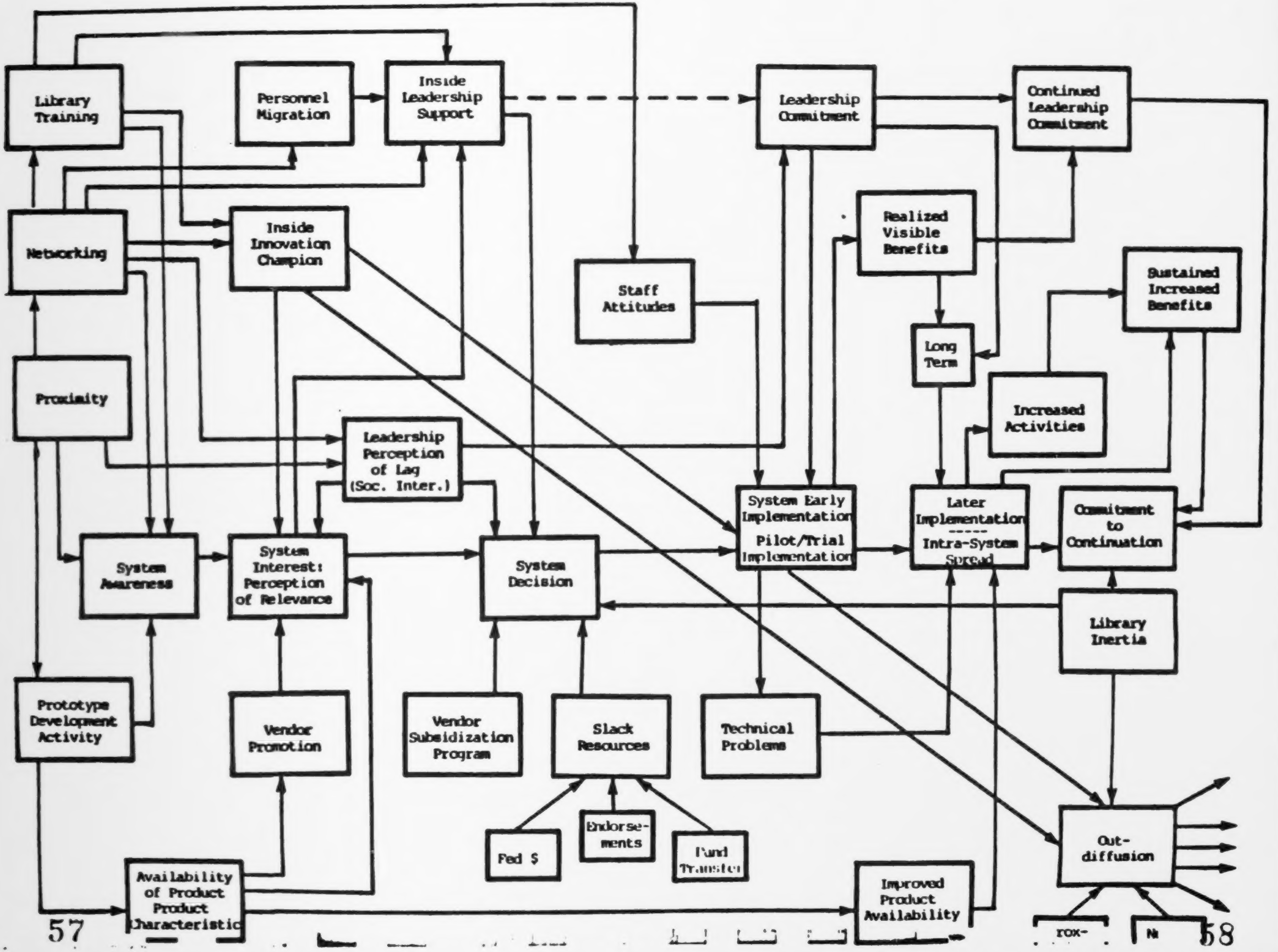
9. Adaptability

Because of the amount of R & D effort expended in customizing the innovations to the library field - most innovations that are adopted are flexible and adaptable to specific library system characteristics. Those who are "premature adopters", i.e., those who are the earliest adapters, will experience the greatest problems with flexibility and adaptability, but will provide input to the R & D process needed to refine the innovation.

2.5 A Revised Model of Diffusion and Utilization of Innovation in Libraries

The hypotheses outlined above were used as the basis for the development of an interview guide for the case studies (see Appendix A). Following a detailed analysis of case study results (see Section 5 of this report for more details) the preliminary model of diffusion and utilization of innovation in libraries was refined. The resulting model is displayed in Figure 3.

Figure 3


Library Training
Personnel Migration
Inside Leadership Support
Leadership Commitment
Continued Leadership Commitment
Networking
Inside Innovation Champion
Staff Attitudes
Realized Visible Benefits
Sustained Increased Benefits
Long Term
Proximity
Increased Activities
Leadership Perception of Lag (Soc. Inter.)
System Early Implementation
Pilot/Trial Implementation
Later Implementation

Intra-System Spread
Commitment to Continuation
System Awareness
System Interest: Perception of Relevance
System Decision
Library Inertia
Prototype Development Activity
Vendor Promotion
Vendor Subsidization Program
Slack Resources
Technical Problems
Fed $
Endorse-ments
Fund Transfer
Out-diffusion
Availability of Product Product Characteristic
Improved Product Availability

Key components of this model of diffusion and utilization of innovation include:

a. As inputs to the adoption decision

- Awareness of the innovation
- Interest in the innovation and perception of its relevance to the adopting organization
- Leadership perception of lag (or the adoption/utilization gap)
- Inside leadership support
- Vendor subsidization programs
- Availablity of slack resources

b. As input to the implementation phase

- Decision to adopt/try an innovation
- Staff attitudes
- Leadership committments
- Inside innovation champion
- Staff involvement in decision and planning for implementation

c. As inputs to an ongoing utilization of the innovation

- Technical problems in the pilot/trial implementation phase
- Improved product availability
- Realized, visible benefits and potential for longer term accrual of benefits
- Continued leadership committment

d. As inputs to secondary diffusion process

- Inside innovation champion
- Pilot/trial implementation phase
- Library inertia
- Possiblity of adoption by other sites
- Networking activities

SECTION 3

INNOVATION STATUS AND PROSPECTS IN THE 1980s

3.1 Significant Innovations of the 1970s and 1980s

Innovations of the 1970s and 1980s which have provided opportunities for significant improvements in library services and operations were identified from an extensive review of the library and information science literature. These innovations are grouped by the library function(s) which they improve:

Intake/Storage

- automated acquisitions
- automated serials control
- AACR II adoption
- bibliographic utilities
- multi-type library networking
- automated cataloging
- preservation

Output/Service

- online catalog
- online searching
- automated circulation
- cable services
- charges for services
- community information and referral services
- computer access for patrons

Management

- planning process
- output performance measures
- integrated library systems

3.2 Potential Impact on the Improvement of Library Systems and Services

3.2.1 Automated Acquisitions

The introduction of an automated acquisitions system often results in the consolidation of several files (e.g., order file, gift and exchange file, want list file) into a single source of information on acquisition of monographs. Some automated acquisitions systems also are suitable for control of standing orders for monographic series, periodicals and other serial publications. Use of an automated system for acquisitions control greatly reduces time spent in searching various manual files and eliminates both the need for filing acquisitions records and the problems associated with misfiled records. Automation of acquisitions saves considerable staff time through system generation of orders, claims, cancellations, reissued orders, acquisitions lists, and management information.

Publishers' catalog data are available for online review and selection via OCLC and can be downloaded into a library's automated acquisitions system. Some book automated systems can interface with acquisitions systems in libraries to allow online placement of orders to speed up the order process receipt. Also, downloading of the jobbers' approval information to a library's stand-alone system can save the high costs associated with inputting bibliographic and billing information.

3.2.2 Automated Serials Control

An automated serials control system can save considerable time in the processing associated with maintaining records for control of serial publications. These processes include ordering, checking in, claiming, missing issues/parts, cancelling subscriptions, reissuing, renewing subscriptions, recording price information, recording locator information, recording binding specifications, scheduling titles for binding, and recording binding charges. The cost savings associated with having a single file for both serials acquisitions and binding control and with eliminating manual searching and filing are substantial.

The automated serials control system not only provides faster searching, but it may also enable library technicians to find hard-to-retrieve titles through use of alternate search strategies, thereby lessening the librarian's load of problem items to handle. An automated serials control system makes feasible the generation and update of microform or printed lists of serials holdings data for use in readers' services and interlibrary loan and for distribution to other libraries. The automated system also may generate management information that previously was unavailable or too expensive to compile.

Some serials jobbers can interface their systems with a library's serials control system and can offer services similar to those listed under automated acquisitions (see 3.2.1).

3.2.3 AACR II Adoption

Adoption of new standards for cataloging all types of library materials, the Anglo-American Cataloging Rules (AACR) II, ensures a high level of cataloging quality, improves bibliographic control and increases the potential for sharing usable bibliographic data. Libraries which enter their cataloging data in a bibliographic utility or other shared cataloging system and do not conform to AACR II standards force other libraries to expend additional effort to upgrade the cataloging data to AACR II standards.

3.2.4 Bibiliographic Utilities

Membership in a bibliographic utility (e.g., OCLC, RLIN, WLN) enables a library to have access to the bibliographic holdings of other libraries. Based on level of participation, a library may enter (online/tape load) its bibliographic holdings into the utility's computer system, use cataloging copy produced by the Library of Congress and other libraries, use Library of Congress authority data and/or use the utility to support online location of needed materials and (online) placement of interlibrary loan requests. The utilities may also offer other services to support library automation (e.g., shared and/or stand-alone automated library systems, retrospective conversion services) and interlibrary cooperation (e.g., serials union list production).

Librarians can save a tremendous amount of effort if they are able to obtain good quality cataloging copy and reduce the amount of original cataloging that they must perform. Their interlibrary borrowing needs also can be satisfied both more easily, through online access to the holdings of a large number of libraries, and more quickly, through online placement of requests for materials. Significant amounts of staff time can be saved in processing requests for needed materials.

3.2.5 Multi-Type Networking

Multi-type library networking includes any cooperative activities which will result in overall improved performance and effectiveness of the participating libraries. Networking may or may not involve shared linked automated library systems. Cost savings may be realized through shared services, systems, equipment and/or discounts on volume buying. Library operations and services will benefit from shared expertise and resource sharing.

In addition to sharing/linking automated library systems and building a shared/linked database of holdings, library networking may involve online placement of loan requests using an electronic mail system (e.g., ALANET), a shared delivery system for interlibrary loan, use of common telefacsimile transceivers for delivery of short documents, development of tools to support resource sharing (e.g., union lists of serials, distribution to participants of libraries' catalogs which are available in microform), shared preservation and conservation services, shared repositories for infrequently-used materials, shared consulting and advisory services, and shared education and training programs.

3.2.6 Automated Cataloging

The use of an automated system for the storage and maintenance of cataloging data can bring significant savings in terms of processing time and can eliminate backlogs of routine catalog maintenance tasks (e.g., shelflist maintenance, authority file maintenance, revision of existing records because of changes in main entry, preparation of new and revised card sets if a card catalog is maintained). A library's stand-alone automated cataloging system may be interfaced with a bibliographic utility so that records may be transferred (i.e., uploaded and downloaded) between the systems either online or by tape. This linkage eliminates the need for duplicate keying of cataloging data.

3.2.7 Online Catalog

The implementation of an online catalog is the next step in the automation of cataloging processes following implementation of an automated cataloging system. The online catalog offers benefits to both library users and staff. Users, once familiar with the system, gain more flexibility in searching (e.g., use of alternative search keys for locating materials, use of search strategies to limit retrieval, use of boolean searching to more quickly locate relevant materials). They also may be able to obtain a printout of the retrieval records, rather than having to manually copy call numbers and and bibliographic data.

The online catalog provides economies to library staff in terms of time savings associated with catalog searching and maintenance. Labor-intensive catalog maintenance tasks can be eliminated (e.g., card filing, review and revision of filing, pulling card sets for maintenance/withdrawal, replacing damaged cards, re-filing card sets).

Implementation of an online catalog also may allow remote searching of a library's catalog by library users and staff/users at other libraries.

3.2.8 Online Searching

Use of online searching of bibliographic and informational databases greatly enhances the quality of reference services that a library can offer its users. The earliest databases available for online searching were bibliographic (i.e., abstracting and indexing services) and are the focus of this current study. More recently, informational databases (e.g., directories, other full-text databases, numeric databases) became available for searching; some of these information products were previously not available in printed form and/or for direct use by the public. Since informational databases are a fairly recent innovation, they are not examined in our study.

Online searching of bibliographic databases may save libraries money in terms of the high cost of some printed abstracting and indexing tools which may be used by a small portion of library users. Implementation of online searching may also lead the library to consider seeking some/full cost recovery for database searching charges. Library users benefit particularly by having the search refined with boolean and other search strategies and by receiving a printout of the retrieval, rather than having to copy/photocopy pages of information.

3.2.9 Automated Circulation

An automated circulation system records the charging out of materials, the return of materials, overdues, items on reserve, items on interlibrary loan, materials at the bindery, and patron records. The system produces overdue notices and management information which may include reports on use of the collection.

Automation of circulation benefits library users and staff by speeding up a labor-intensive manual operation. Use of an automated system also consolidates numerous files (e.g., circulating materials, materials on reserve, materials on loan, patron records) and provides management with information that would be impossible or very expensive to compile manually. This information assists in decision making concerning staffing of the circulation desk and purchase of additional copies of heavily-used materials. Another benefit of automation of circulation involves taking an inventory of the collection.

Scanning the machine-readable labels (e.g., barcodes) used with the circulation system can greatly speed up the inventory process.

3.2.10 Cable Services

Cable services can be implemented to provide video programming, video conferencing and data transmission. Implementation of these cable services can improve both the range and quality of reference and other services which a library can provide to its users and can improve the speed and cost-effectiveness of transmission of digital communications between libraries. Use of cable services can enable a library to reach people who do not (or are not able to) come to the library and can provide unique services to special interest groups within the community.

Specific services which can be provided via cable include production and broadcasting informational and instructional programs; broadcasting pre-programmed information, including professionally-produced video programs and tapes of city council sessions and zoning commission hearings; video reference service which transmits images from printed material in response to telephone inquiries for specific information; one-way delivery of prestored digital teletext so that the user may review the text and select pages which are of interest; and delivery of videotext in an interactive mode so that the user may select desired information from a menu, may search a database (which could be a library catalog), may respond to questions in an educational or discussion context, and may request additional information or service. Most of these cable services are fairly recent innovations for libraries.

3.2.11 Charges for Services

Charging for library services may include charging for interlibrary loan and photocopying of library materials, charging for loan of library-owned audiovisual equipment, and charging for online database searching and other specialized reference services. There is considerable controversy over the appropriateness of charging for services, but the necessity for charging may arise as library operating budgets decrease and demand for services increases. Another basis for charging is ongoing provision of service by a large library for a smaller library (e.g., large-volume interlibrary loan support, online searching and reference referral services, technical processing services using the larger library's automated systems and access to bibliographic utilities). With the advent of cost-recovery at the federal level, many libraries are or will be required to do the same.

3.2.12 Community Information and Referral Services

The development of community information and referral (I&R) services by libraries provides users with a single source for much community information that previously was difficult to locate from a number of government agencies and other organizations. The I&R services are designed to fill specific informational community needs including job information, literacy, child care, educational and cultural programs and events, and a wide range of diseases. Libraries also may systematically provide I&R services to community-based organizations, neighborhood block clubs, community councils and other non-profit organizations. These I&R services improve the reference service offerings of a library and increase the library's visibility and image in the community.

3.2.13 Planning Process

In recent years the need for formal planning by libraries has been encouraged by an increasing number of library organizations and other members of the library community. The planning process is a management tool that can be used with the goal of increasing library effectiveness and efficiency, better exploiting opportunites, and successfully adapting library services and operations to a changing environment. The basic activities in the planning process include assessing the library and information needs of the community, evaluating current library services, determining the library's role, establishing goals, objectives and priorities, developing and implementing new strategies to accomplish the stated objectives, collecting data and evaluating the degree to which objectives are accomplished. The planning process continues in subsequent cycles with reviewing and updating goals, objectives and priorities, developing and implementing new strategies for accomplishing objectives, and identification of any new information needs for ongoing evaluation of existing and proposed library services and operations.

As a management tool, use of a formal planning process should enable planners to successfully direct ongoing change process. Using a written plan provides means for justifying a library's activities and demonstrating accountability. The written plan can also be used to effectively demonstrate to funding agencies, governing bodies and other individuals/organizations that the planners know what needs to be done and have strategies for accomplishing specific objectives. The library can be forward looking and proactive through use of the planning process.

Formal guides have been published to assist libraries in the planning process (e.g., Palmour, et al. A Planning Process for Public Libraries. ALA, 1980). The planning process takes place not only at the local level, but also at the consortium/regional level, at the state level, at the national level and at the international level.

3.2.14 Output Performance Measures

Increasingly library managers have been asked to justify library expenditures on the basis of achieved performance — how well their libraries satisfy their users and how efficiently basic functions are performed. In order to assist libraries in this evaluation process, standard methods of collecting and reporting output measures results have been developed under the sponsorship of professional organizations (e.g., Zweizig and Rodger. Output Measures for Public Libraries, a Manual of Standardized Procedures. ALA, 1982; and Kantor. Objective Performance Measures for Academic and Research Libraries. ARL, 1984). Measures which have been developed examine availability of library materials, accessibility of library materials, analysis of patron activity, and delay analysis of specific library activities.

Use of these standard measures of library effectiveness enables a library to evaluate its performance and also to compare its performance with libraries of similar size and type. Review of these quantitative data can lead managers to quantifiable improvements in library services and operations.

3.2.15 Integrated Library Systems

Integrated library systems which support the automation of all major library functions are the most recent trend in the field of library automation. Using a single automated system to support acquisitions, serials control, invoice processing, cataloging, circulation, etc., rather than using several automated and manual systems to support library functions, enables a library to optimize its costs and staff effort associated with operation and maintenance of automated systems. With a single system bibliographic data can be stored once and used for a variety of purposes, thereby optimizing costs associated with data input and storage. Any automated system requires ongoing system maintenance procedures, and therefore it is more economical to maintain one system rather than several. Staff time can further be saved by their needing to learn and log on to one system only. Also, the integrated library systems are designed to provide management with more system-generated management information than could be provided by single function systems and to obtain specialized reports on demand from the system.

3.3 Most Significant Innovations: The Selection Process and Defining Parameters

In reviewing the set of innovations identified through our literature review, we developed a set of criteria for formally evaluating the innovations as studyable within the budgetary and time constraints of this project.

Innovation can be broadly defined as any idea, practice, or object initially perceived as 'new' by the members of a particular social system and with an observable pattern of spreading acceptance among members over time. However, this definition is so broad as to include literally hundreds of things that might happen in the library world over a ten year period. For the purposes of a useful and meaningful study it is necessary to restrict consideration to innovations which can be (a) clearly delineated and distinguished from non-innovations, (b) credibly claimed to have some importance as changes or improvement in library systems, and (c) readily subjected to empirical study within the limits of the current project. Each of these necessary conditions suggests a set of criteria for determining the most appropriate innovations for study. Four criteria are proposed below under each of these three major categories of consideration.

3.3.1 Delineation

Criterion #1: CLARITY: does the innovation have clear descriptive dimensions? It is of great importance that an innovation can be described in words and pictures which mean generally the same thing to the population of potential adopters or users. Thus, an expression such as "improved management" might mean more stringent control to one library and more autonomy to another. There is almost no basis on which to determine that the same words mean the same thing in different contexts. On the other hand, "acquiring a microcomputer" conveys generally the same concept, regardless of the library context, even though uses may differ widely, manufacturers are many and software possibilities abound.

Criterion #2: NOVELTY: is the item under consideration clearly distinguishable from routine practices and products already in use or previously used? Very few items are complete innovations in the sense that no one anywhere has ever created or tried or used them before. Most so-called "new" items are variations, adaptations, or additions to things that are familiar, and it is often hard to draw the line between what is new and what is not. Generally, however, novelty is relative and in this study it is relative to libraries in North America from roughly 1970 onward. In other words, whereas an item like "performance measures" would not be considered particularly new to industrial production within the last generation, it is definitely a recent concept in the library world.

Criterion #3: PORTABILITY: can the prototype innovation identified in an initially adopting site be transferred to other sites in generally recognizable form, while retaining its key defining characteristics? A given library might, for example, select the Pike's Peak Public Library's "Maggie's Place" system to support library automation.

Criterion #4: ACKNOWLEDGEMENT: is the innovation sufficiently noted in the literature and given reference in library circles as an innovation? Certain changes in library practice or function might be noted by scholars or shrewd observers but not perceived or reported on widely by people in the library field.

3.3.2 Significance

It is not necessarily the case that innovations of profound significance diffuse in any different way from trivial innovations. Scholars may learn as much about the process from the latter as the former. However, given limited resources, it is feasible to select innovations for special study which appear to have some special significance for the future of libraries, for the library system as a whole, or for library users and library personnel. At least four criteria come to mind as follows:

Criterion #5: EFFICACY: does the innovation exhibit outcomes that clearly indicate advantages over practices and products currently in use? There are innumerable ways to judge efficacy, e.g., cost and labor savings; service to users which is faster, more accurate, more efficient; functions which are expanded, diversified, integrated, etc. Diffusion researchers frequently refer to this dimension as "relative advantage", i.e., the degree to which the innovation shows some advantage for someone over the item that it supplants. However, innovation does not necessarily involve supplanting or substitution but might merely constitute an addition. Simply put, this criterion asks "what good will come of it?".

Criterion #6: ADOPTABILITY: is adoption within the capability of the majority of the intended user population of libraries? Some libraries might simply not have sufficient fiscal or human resources to implement certain innovations or they might not have the physical space, equipment, or management structure to accommodate them.

Criterion #7: RELEVANCE: is the innovation relevant to the operations of most types of libraries? Certain innovations might make sense only for one type of library operation, let us say a very large library or a very small one, or for a library with a certain type of collection or clientele. For the purpose of this project we would like to select innovations which are as widely relevant and applicable as possible.

Criterion #8: MAGNITUDE OF IMPACT: does adoption represent a significant change in the functions, organization, or services of libraries who adopt? Certain changes such as relabelling libraries as information centers might be very widespread and might apply to all kinds of libraries yet still not represent a substantial impact. Some changes also merely represent continuations of trends already in place as when a library goes from automated monograph acquisition to automated serials control. The very first step towards system automation would probably deserve to be called significant. However, each additional step along the way toward an integrated library system would not deserve the same rating.

3.3.3 Measurability

Some innovations might appear to be highly significant and yet not be suitable for study within the project because they cannot be readily measured. There are at least four important considerations in this category.

Criterion #9: EVIDENCE OF DIFFUSION: has the innovation diffused to a significant proportion of the potential user population as of the date of field work commencement? There is no obvious clear cut definition of "significant proportion". The concern is that an innovation be selected which is diffusing to some extent and for which some number of adopters will appear. Previous diffusion research strongly suggests that there is a point between 5 percent and 10 percent of the population where diffusion takes off. Many potential innovations, if not most, are failures as far as diffusion is concerned, i.e., they get up to one, two or three percent adoption and then languish for a variety of reasons, e.g., because they are superseded by others, because times change, because they do not turn out to have the positive effects promised. It is important for this study to study the diffusion process; therefore, some diffusion must have occurred. We somewhat arbitrarily have chosen 10 percent as the desirable minimum diffusion to make an innovation appropriate for study.

Criterion #10: RECENCY: has the innovation reached the diffusion stage in the recent past? If innovations have been around too long, respondents are less likely to recall crucial details of the adoption decision process and the early implementation phase. A 10 year perspective seems to be more or less optimal as a period which allows for considerable diffusion to have occurred while early adoption events remain within the active memory of library staff.

Criterion #11: ORIGINATION: can the origins and first users of the innovation be identified and made available for study? For the purposes of diffusion research it is important to determine the point at which innovation began, i.e., the point at which the prototype of the innovation was first made available to potential adopters and users.

Criterion #12: CASE ACCESS: can adopters be readily identified, distinguished from non-adopters, and sampled on some systematic basis? This criterion is related to #1 and #4 above, but here the concern is for access. Do innovation promoters and vendors maintain lists of adopters? Are respondents able to identify and recognize themselves as either adopters or non-adopters with reasonable accuracy?

After an initial scoring of the innovations by the criteria, the very low scoring innovations were excluded, thereby reducing the number of innovations under consideration to 15. A revised matrix of innovations and criteria was developed and sent out to the members of the Project Advisory Group for review and completion. The results of their scoring were collated and are displayed in Figure 4 on the next page.

The highest scoring innovations (as determined by our Advisory Group members) are:

- bibliographic utilities (55)
- online searching (54)
- automated cataloging (50)

Figure 4

CRITERIA	INNOVATION TYPES														
	INTAKE/STORAGE						OUTPUT/SERVICE						MANAGEMENT		
	AUTOMATED ACQUISITIONS	AUTOMATED SERIALS CONTROL	AACR II ADOPTION	BIBLIOGRAPHIC UTILITIES	MULTI-TYPE NETWORKING	AUTOMATED CATALOGING	ON-LINE CATALOG	ON-LINE SEARCHING	AUTOMATED CIRCULATION	CABLE SERVICES	CHARGES FOR SERVICES	COMMUNITY I&R SERVICES	PLANNING PROCESS	OUTPUT PERFORMANCE MEASURES	INTEGRATED LIBRARY SYSTEMS
DELINEATION															
1. Clarity: does the innovation have clear descriptive dimensions?	5	5	4	5	-2	5	5	5	5	2	1	3	-1	5	3
2. Novelty: is it clearly distinguishable from routine past practice?	5	5	4	5	1	5	5	5	5	5	3	0	0	3	2
3. Portability: Can the prototype be transferred from one site to another while retaining key defining characteristics?	5	5	5	5	1	5	5	5	5	3	2	4	5	5	3
4. Acknowledgement: is the innovation sufficiently mentioned in the literature related to libraries and information services to be widely acknowledged as an innovation?	4	5	2	5	-1	5	5	5	5	3	1	3	4	4	4
SIGNIFICANCE															
5. Efficacy: does the innovation exhibit outcomes that clearly indicate advantages over existing practices and/or products in use?	3	4	-2	5	0	5	5	5	5	3	0	2	1	4	5
6. Adoptability: is adoption within the capability of the great majority of libraries?	5	5	3	4	1	3	2	5	5	0	2	3	4	5	2
7. Relevance: is the innovation relevant to the operations of al types of libraries?	3	3	3	5	3	3	3	5	1	-1	0	-5	4	5	3
8. Magnitude of impact: does adoption represent a significant change in the functions, organization, or services of libraries?	-1	-1	-3	3	1	5	3	2	0	0	3	-3	0	3	3
MEASURABILITY															
9. Evidence of diffusion: have 10% or more of libraries adopted?	1	1	2	3	1	1	-3	2	0	-2	0	1	1	0	-3
10. Recency: has most of this adoption occurred within the last 10 years?	5	5	5	5	5	3	5	5	5	2	2	-1	2	3	5
11. Origination: can the origins and first users be identified?	4	4	2	5	3	5	5	5	3	2	0	2	1	0	5
12. Case access: can adopters be identified and sampled on some systematic basis?	5	4	2	5	3	5	5	5	5	2	-3	2	0	0	4
TOTAL	44	45	27	55	17	50	45	54	44	19	17	11	21	37	36

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However, as these are all technology-based innovations, we prefer to consider instead the top scoring innovations in each group of innovations. This would revise the outcome to:

- bibliographic utilities
- online searching
- output performance measures

We therefore proposed these three innovations as candidates for detailed tracer studies.

SECTION 4

TRACING OF SELECTED INNOVATIONS OVER TIME

4.1 Bibliographic Utilities

The history of bibliographic utilities had its beginning in cooperative efforts for resource sharing among libraries in the late 1960s. At this time (1967) members of the Ohio College Association, both state and private institutions, decided to found the Ohio College Library Center (OCLC). The decision to establish OCLC was the result of more than 15 years of previous efforts to explore and facilitate cooperation among Ohio's academic libraries (Branscomb and Rogers, 1981).

In its earliest years, membership in the Ohio College Library Center was indeed limited to academic libraries in the State of Ohio. Developed to facilitate interlibrary loan and cooperative collection development, OCLC's earliest stage can be roughly characterized as being a central store for Ohio-wide union cataloging data. By the mid-1970s, other libraries in the State of Ohio wanted to participate. As membership grew, so did the database of shared cataloging data, the acceptability of which was facilitated by OCLC's acceptance of MARC data and format. (MARC, or Machine-Readable Cataloging was "born" at approximately the same time as OCLC; designed to facilitate conversion of bibliographic data into a standard machine-readable form, it relies on a system of tags and delimiters, etc., to code and distinguish each element and accompanying component sub-elements of a bibliographic entry.)

OCLC's database went online in fiscal year 1971/72, a development which further increased its attractiveness, not only as a source of information about where an item was held, but more importantly, as a source of cataloging data. Not only did OCLC use the same format as the Library of Congress for cataloging data, thus "assuring quality", but also additions to the database came from LC MARC tapes as well as from member libraries.

Most importantly, if an institution was linked to OCLC, it no longer had to wait days for Library of Congress cataloging data to arrive in the mail; the cataloging copy, as well as the location(s) of the item, was there at the library's fingertips.

Developments in OCLC member services continued as technology advanced and the financial base, provided increasingly by members' institutions, grew. While members could laboriously use the bibliographic and location data present in the OCLC base to facilitate traditional methods of interlibrary loan (ALA requests, local policies for cooperation, etc.), OCLC soon devised a subsystem whereby interlibrary loan requests could be transmitted online (April 1979). (By this time OCLC had outgrown its bounds as an institution limiting its services to the State of Ohio. From a membership of less than 50 Ohio academic libraries in 1967, OCLC had grown to approximately 750 members.) Even prior to the start up of the OCLC interlibrary loan subsystem, OCLC had developed a methodology for serials control. Begun January 1975, the serials control subsystem facilitated the never-ending chore of recordkeeping for issues received, missing issues/claiming, title changes, cessations, mergers and the like.

As membership continued to spread across the country, the demand for OCLC's services was great; members were becoming increasingly more sophisticated in their expectations both in terms of the quantity and quality of services. Perhaps as an outgrowth of the geographic dispersal of OCLC's members and the strain on its services, regional consortia or networks developed (e.g., AMIGOS, PALINET, SUNY/OCLC) to "broker" OCLC's services. Furthermore, while technology costs were decreasing, for some smaller libraries, aware of the costs that could be cut by accepting others' cataloging data, the cost of an IBM Beehive terminal was still prohibitive. At first surreptitiously, but soon under OCLC's regulated aegis, these smaller institutions could not only search for bibliographic data by buying time on a neighboring institution's terminal, but also input their own holdings as full members of OCLC by special arrangement.

The most recent years of OCLC are still characterized by growth, but growth in the size and variety of its bibliographic database, rather than the size of its membership. (This is not to say that membership is not continuing to grow; rather, OCLC's membership can be considered to have reached a point of relative stability, perhaps because libraries now have other choices in long standing, fully operational bibliographic utilities, discussed below). OCLC's acquisitions subsystem became operational in 1981; other subsystems and services, e.g., subject access, are under development.

Owing to the sheer size of its membership, the size of its database and its continued prosperity and development — it is now called the Online Computer Library Center — OCLC can be considered the "mother" of the other bibliographic utilities. Still, important differences exist between it and the other utilities. RLIN, the second bibliographic utility in chronological terms, also grew out of the cooperative efforts of academic libraries. In this case, however, founding institutions were primarily the research libraries of major academic institutions in the United States. The Research Libraries Group (RLG), then including Harvard University, Columbia University, Yale University, and the New York Public Library, had been involved for some time in facilitating resource sharing in order to improve the efficiency of library operations. Interested in creating an automated bibliographic processing system, in 1974 RLG began to investigate this area. In 1978, RLG signed an agreement to acquire Stanford University's BALLOTS (Bibliographic Automation of Large Library Operations Using a Time Sharing System at Stanford).

BALLOTS, begun in 1972 at Stanford University, received a joint grant from the Council on Library Resources (CLR) and the National Endowment for the Humanities (NEH) which resulted in the shared cataloging module becoming operational by late that year. By the early to mid-1970s, an acquisitions module had been added and the system had been expanded to permit searching of the database by other libraries in California via a contract with the California State Library. By 1975, 7 public libraries were using BALLOTS data, both online and via tapes provided for their in-house systems. The later mid-1970s saw the advent of catalog card production by BALLOTS and the expansion of "membership" to libraries outside the state of California. The shared cataloging module, whereby members other than Stanford University could not only search the database and order cards, but also input their own cataloging data, was implemented in 1976 and became operational in approximately 1977.

It was this shared cataloging database that became the foundation for RLIN, as BALLOTS was renamed by RLG, in 1978. Although Harvard University withdrew from RLG, Stanford joined the Research Libraries Group when RLIN was acquired. Stanford continues to provide computing facilities for RLIN, and acts as a host for RLIN's staff. RLIN membership is open to two classes of libraries: 1) ARL libraries, libraries with highly specialized materials, and libraries that are participants in RLG's special programs, and 2) other libraries, both new members and continuing members of the later BALLOTS system, whose RLIN access is "brokered" via CLASS (California Library Authority for Systems and Services). When first operational, RLIN provided only shared cataloging to its members; the acquisitions module available as part of BALLOTS was not initially available. However, unlike OCLC, RLIN has, from its earliest days, provided subject access to its bibliographic database. From its inception, RLIN, like OCLC, used the MARC formats and character set. As MARC formats for materials other than books (e.g., serials, music, audiovisual materials, etc.) were developed, they were incorporated into RLIN. In 1981, after having undergone major revisions, RLIN emerged as a new edition — RLIN 2. In RLIN 2, all MARC formats were integrated into one file, the acquisitions and interlibrary modules were operational, and a developmental authority file was available to its members. Currently, RLIN provides an "integrated technical processing system" with the current version of the Library of Congress Name Authority file available for searching via RLIN.

Washington Library Network (WLN, now The Western Library Network), the youngest U.S. bibliographic utility, had its beginning in the state of Washington in the 1970s. The design of the system, sponsored by the Washington State Library, was carried out by Boeing and tested from 1975 on for several years using the records from the machine-readable bibliographic database already available from a number of cooperating libraries in the state of Washington (Plotnik, 1980). In early 1977, WLN became operational online with 10 member libraries from Washington State. Like RLIN, WLN provides subject access to its database and authority files that are searchable online. However, unlike both RLIN and OCLC, WLN was operated under the auspices of a state library and membership size has remained fairly small. From an initial membership consisting primarily of public libraries in the state of Washington, WLN had grown to 125 member libraries of various types, both in the Pacific Northwest states and in British Columbia. WLN, initially a state-wide network like OCLC, is now attempting to grow primarily by increasing the number of member institutions. Recently the network became an independent non-profit organization, independent of the state library. WLN's software, unlike that of OCLC and of RLIN, is available for sale, and is in use in libraries as far away as the National Library of Australia. WLN's reputation for excellence, especially with regard to its authority files, has drawn the notice of RLIN. With funding from the CLR and the assistance of the Library of Congress, RLIN and WLN are working on a project to link their records and share authority files based upon the development of computer protocols enabling a member of one utility to search another utility's database without directly "logging on" to that system.

In observing the patterns and rate of growth of adoption and utilization of bibliographic utilities, we gathered membership data from the three major utilities, OCLC, RLIN and WLN. The growth to date shows no inclination of a levelling off as demonstrated by the growth trends displayed in Figures 5 - 7.

Another approach to tracing the diffusion of an innovation over time is to study the appearance of the innovation in the published literature. Such tracer studies have been facilitated by the development of online database containing abstracts of published literature. We conducted, as part of this study, a mini-study of the appearance of the three innovations of interest in the published literature. Selecting one database only (to simplify analysis), the ERIC database which covers the library literature fairly well, and checking that there were no major changes in policy of coverage of the database in the past decade, we searched for each innovation in turn. In Figure 8 the cumulative number of publications on bibliographic utilities over the period 1974-1985 is displayed. Comparing this tracing of bibliographic utilities with the growth in membership of the three utilities, clearly demonstrates that the emergence of RLIN and WLN in the late 1970s affected the adoption of bibliographic utility services by libraries.

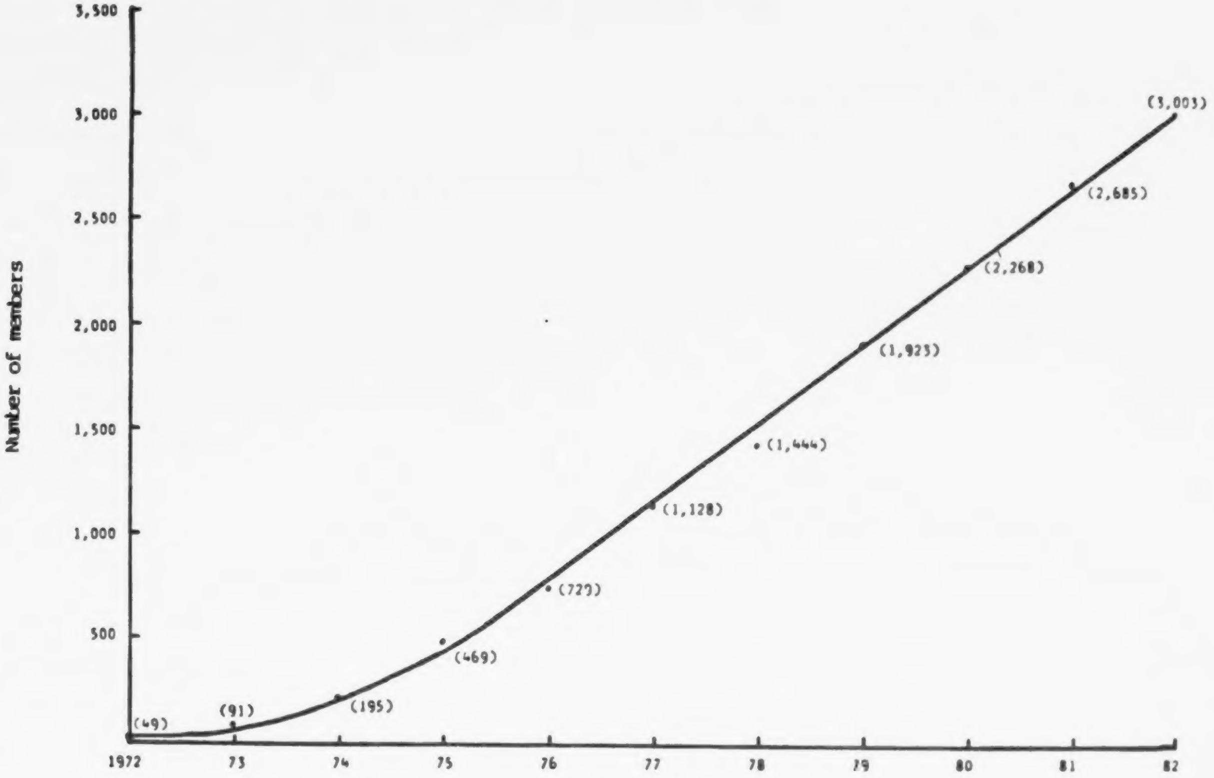


Figure 5. OCLC - Growth in membership, 1972-1982

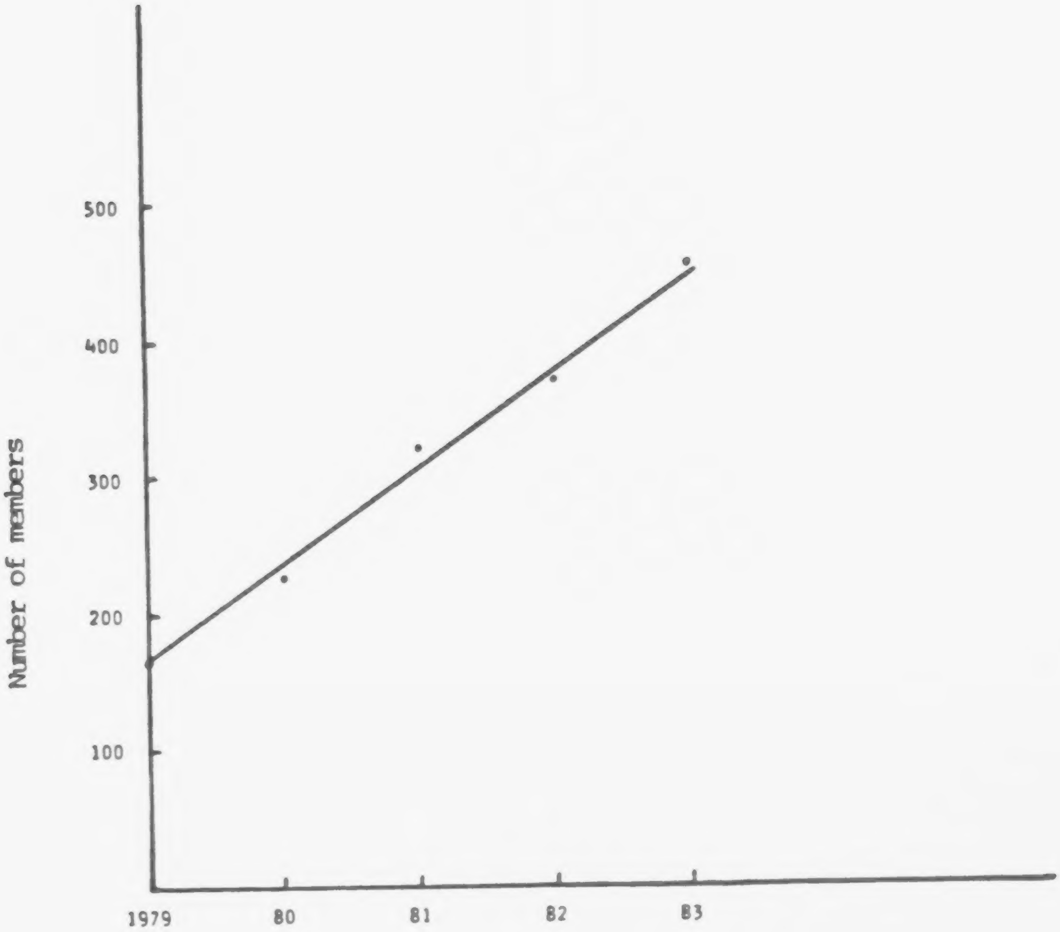


Figure 6. RLIN - Growth in membership, 1979-1983

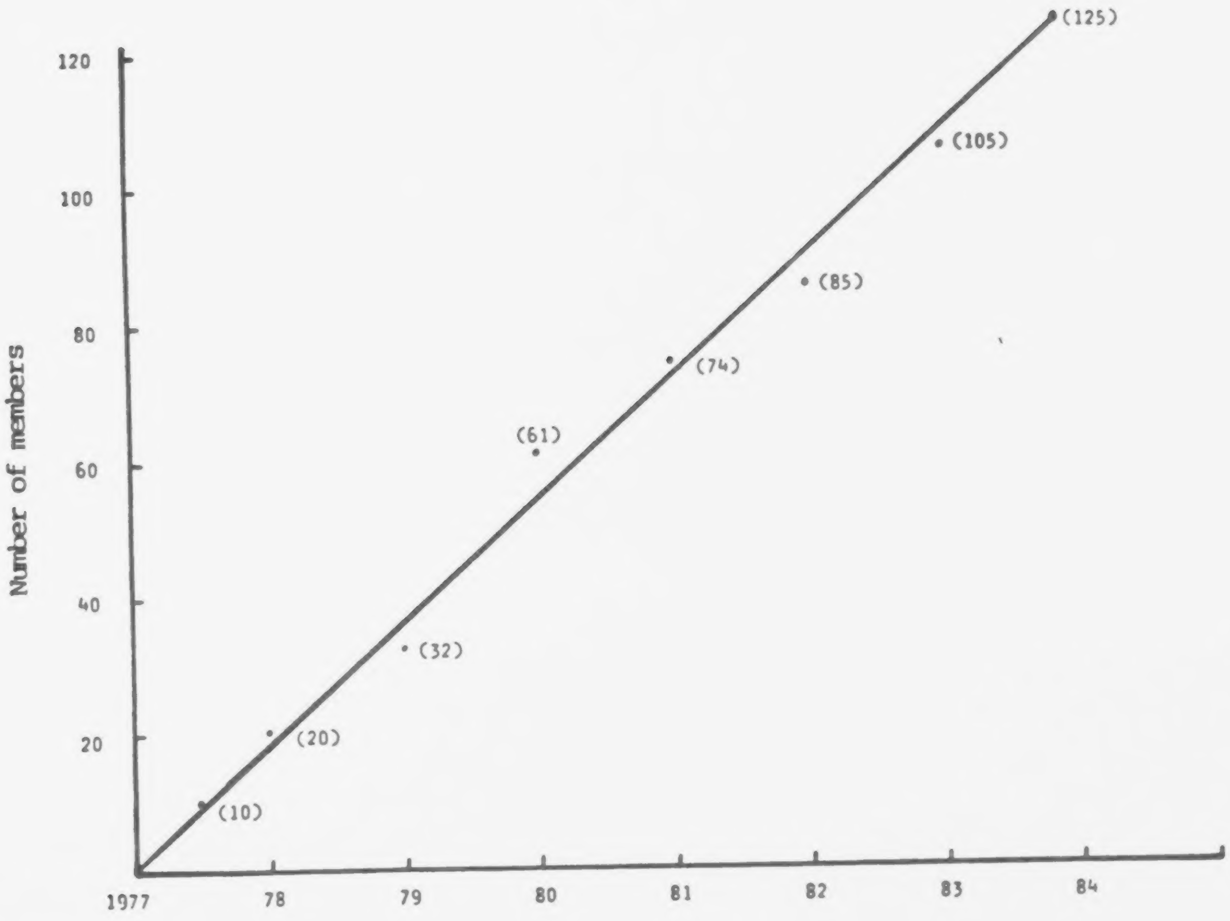


Figure 7. WLN - Growth in membership, 1977-1983

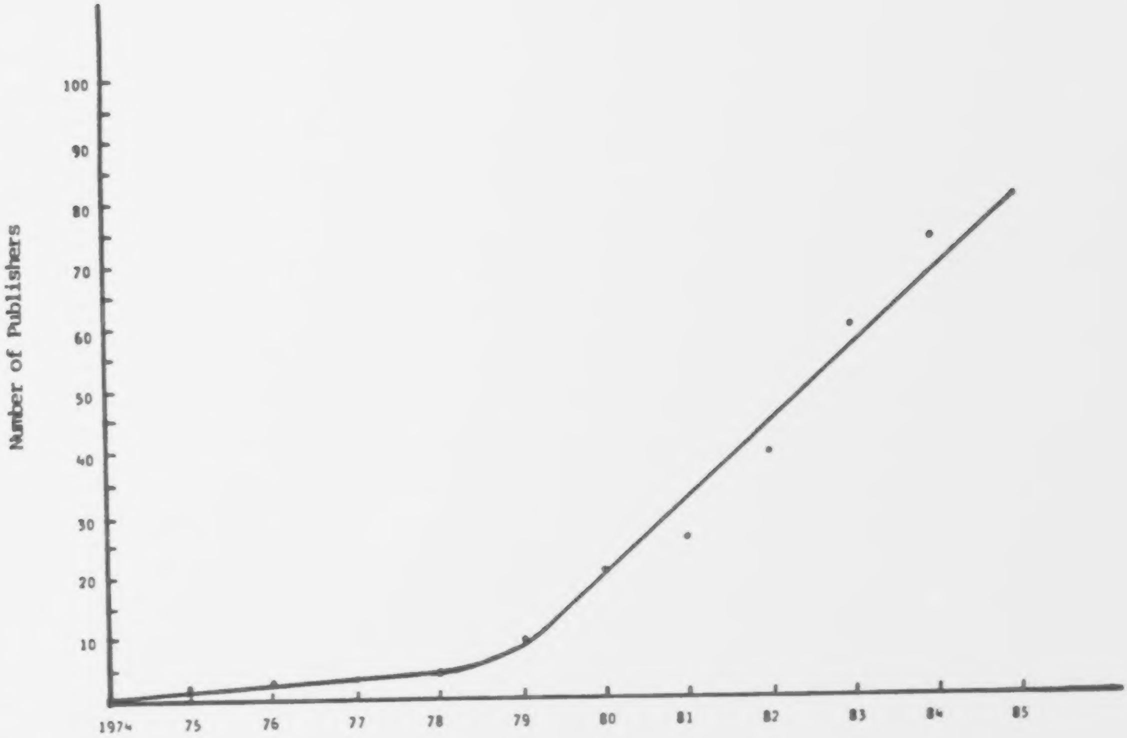


Figure 8. Cumulative number of publishers on Bibliographic Utilities, by Year

4.2 Online Searching

Online database searching had its beginning as an idea that grew out of batch-searchable scientific databases created in the mid-1960s. Developed under government sponsorship to facilitate communication in the scientific and technical arena, NLM's MEDLARS database, available for batch searching only in its earliest stages, can be considered the precursor of publicly-available online bibliographic databases. By 1968, developments were underway to make MEDLARS searchable in the online mode. The State University of New York at Syracuse developed an online bibliographic retrieval system based on MEDLARS files that has been operating since December 1968 (McCarn, 1970). At approximately the same time, NLM, assisted by the System Development Corporation (SDC), began to work on online retrieval of full MEDLARS files. For the next few years, development and testing continued, and MEDLINE (MEDLARS online) was initiated by the National Library of Medicine as a nationally publicly-available service on October 29, 1971 (McCarn, 1973). One year later, there was an "average of 25 simultaneous users" and "10,605 searches" had been processed.

During this period of the late 60s–early 70s, other commercial firms, soon to become the major online database vendors, were also hard at work developing computerized information retrieval systems. These efforts at developing limited databases with restricted, primarily government access in the late 1960s were soon to bear fruit in the commercial sector: Lockheed and SDC let commercial contracts for online retrieval service in 1972, and Mead Data Central, Inc. offerred access in the early 1970s to the Psychological Abstracts database with its PADAT (Psychological Abstracts Direct Access Terminal) system.

The very early 70s saw the production and mass commercial availability of a number of commercial online databases, overwhelmingly in scientific and technical fields, via the information retrieval systems developed by the major vendors - SDC's ORBIT, Lockheed's DIALOG, and so on. In this period, searching capabilities were restricted to controlled vocabulary access.

Although online databases were commercially available by the early 70s, libraries were slow to use them, primarily because they lacked the required associated technology and costs prohibited them from acquiring it. Furthermore, for all but scientific, technical, and medical libraries, the range of subjects in which databases were available was still too restricted to gain their serious interest. These "special" libraries became the first group of users of online searching.

Other types of libraries were soon to participate in online searching. Continuing vendor refinements, decreasing technology costs, and the production of databases covering "non-scientific" fields in the first half of the 1970s combined to make online searching more attractive to libraries. In 1974, the number of online searches of "bibliographic, bibliographic-related, and natural language databases" performed numbered 700,000 (Hawkins, 1981), and by 1975 there were 301 "bibliographic, bibliographic-related, and natural language databases" commercially available (Williams, 1980).

The second half of the 1970s was a period of major expansion. New firms entered the arena as producers and/or distributors of online databases. Academic libraries, and to a lesser extent, public libraries, had begun to experiment with online searching, occasionally with the encouragement of vendor-supplied trial period subsidies. New bibliographic databases proliferated in a wide variety of subjects — both those originally produced as online files, and those newly converted from hard-copy only to availability in machine-readable format. By the end of the 1970s online database searching had fully penetrated the awareness of libraries and was quickly becoming firmly established in academic libraries in addition to special libraries. Hovering around one million searches annually in the mid-70s, by the end of the 1970s, the growth in the number of searches performed was tremendous; in 1979 an estimated four million online searches of bibliographic (and related) databases were performed. The number of databases had grown from 301 in 1975, to 362 in 1977, and to 528 by the close of the decade. As demand grew, the preparatory needs of online searchers began to be filled not only by vendor-supplied specific system and/or database training, but also by the incorporation of education in online searching in its broadest sense (choosing a database, preparation of search strategies, Boolean logic, etc.) into the curricula of library schools.

Libraries participating in online database searching, pressed by budgets actually declining in their buying power, began to consider cancellation of print abstracts and indexes that duplicated online resources; the phenomenon of migration had begun. Proliferation of databases continued, along decreasing technology costs. Retrieval systems and searching capabilities became increasingly sophisticated as producers and vendors took advantage of hardware and software development. Free-text searching capabilities (in addition to controlled vocabulary) were developed and a new kind of textual (i.e., not strictly bibliographic) database appeared on the scene covering the legal field in which not just bibliographic citations to documents were included, but also the entire text of the documents was available for searching in machine-readable form.

In the current decade, growth in the online industry continues, but it is growth of a somewhat different kind at a somewhat slower pace. More and more libraries are starting to perform online searching as a user service, including public libraries. However, public libraries in general tend to lack the funding necessary to provide searches to the users without seriously depleting their budgets. Thus, whether or not and on what basis to pass searching costs on to users has become a current issue in many libraries, especially in public libraries. Along with the number of libraries participating, the number of searches performed annually continues to rise: in 1982 the number of searches performed (excluding those of the LEXIS database) was estimated to be approximately eight million. While the number of databases available continues to grow (773 in 1981, 1,000 estimated in 1983), the number and kind of organizations involved in "online" is also growing, as a result of changing and expanding roles. Database distributors have also become database producers with the introduction of machine-readable indexes to the databases they distribute (DIALINDEX, CROSS, etc.). On the other hand, that database producers who are also vendors, i.e., make the databases commercially available, is not a new development. For example, ISI's Social Science Citation Index and Science Citation Index have been available only via vendors. More important in terms of changing roles is the recent acquisition of two major vendors, SDC and BRS, by larger organizations and the increasing participation of new types of organizations in the online database industry independently and/or via mergers, and for joint ventures. Organizations previously involved in publishing and other information related activities, but not necessarily involved in publishing hard-copy secondary services (A&I tools), are now entering the online database industry for the first time in increasing numbers. This expansion and decreasing distinction of roles assumed by organizations in the online database industry can be referred to as vertical integration (Williams, 1981).

Other changes in the field are now occurring. Until recently, the primary marketing efforts for online databases were directed to intermediaries — librarians, information specialists, brokers, etc., because of the level of skill necessary to conduct a search, among other reasons. As a result of the ever-increasing refinement of searching software and the increased market for bibliographic and for text (e.g., patent databases, financial databases), end-users are and will be participating in online searching in larger numbers. That this is the case may also be partially attributed to the continued "downsizing" of the required technology; microcomputers can now be used to search downloaded data, resulting in major bibliographic database vendors, DIALOG and BRS, making their databases accessible to the end-user at his home computer (Neufeld, 1983).

Growth in the adoption of online searching by libraries is hard to trace. The major problem is that vendors will not indicate the numbers of libraries that subscribe to their service. However, the number of searches performed on databases is available. In Figure 9 the growth in the number of online biblographic searches (i.e., searches of abstracting and indexing databases as opposed to numeric databases) is displayed.

The tracing of online bibliographic database searching in the published literature resulted in a similar diffusion pattern as shown in Figure 10.

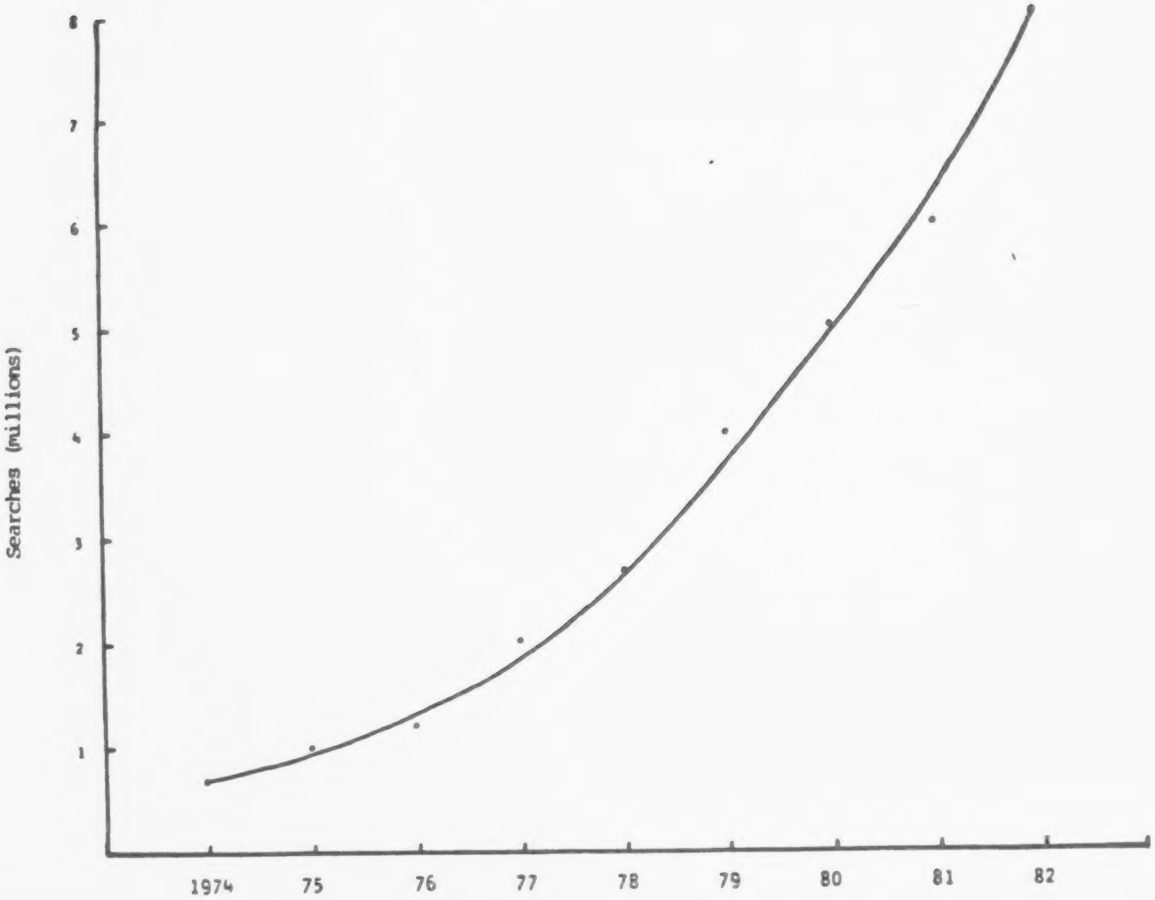


Figure 9. Growth of number of online searches of bibliographic databases, 1974-1982

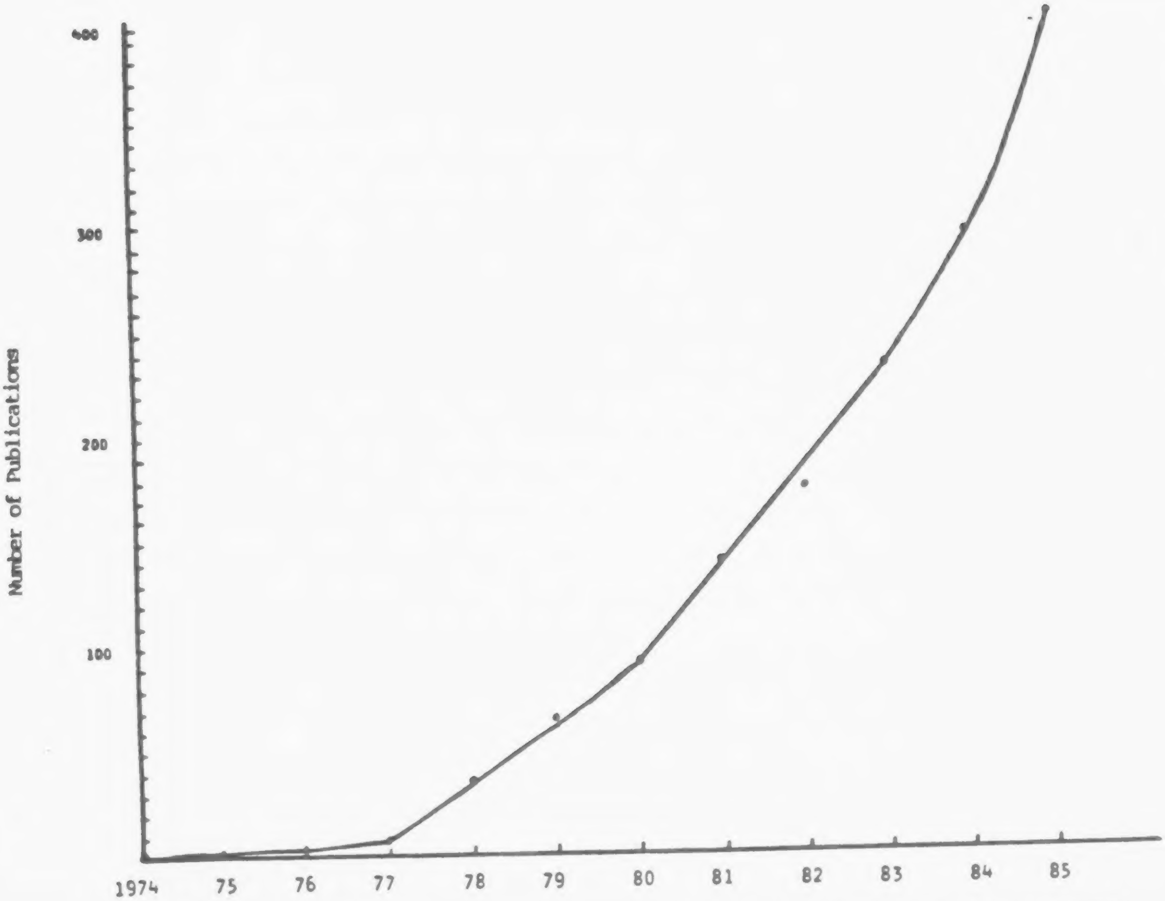


Figure 10. Cumulative number of publications on Online Database Searching, by Year

4.3 Output Performance Measures

Output performance measures for libraries can be defined in several different ways. However, it would appear that measures of library outputs (in terms of services provided to users) as opposed to library inputs (in terms of size of collection, number of personnel, etc.) were first discussed in Performance Measures for Public Libraries (DeProspo, et al., 1973) published by ALA. This report covered the first three phases of a study sponsored by PLA and conducted by the Bureau of Library and Information Science Research at Rutgers University: Measurement of Effectiveness of Public Library Services Study. Based on an extensive review of previous efforts to determine library effectiveness and performance, and on an analysis of existing library statistics gathered at the federal, state and local levels, the report recommended a new approach to public library measurement and evaluation. The new approach is the measurement of the outputs of a library and library service. The report demonstrated that it is possible to gather data that describe the services a library provides to its constituents. Furthermore, the report outlined six criteria for selecting "meaningful indicators":

- data required for the measurement tests must be collectable at the local level
- data collection must be amenable to the use of sampling techniques
- the measurement criteria must differentiate between libraries
- the measurement criteria should be capable of supplementing or replacing existing statistical reporting systems
- the measurement tests, while objectively based, should be constructed in a manner suitable for interpretation by practicing librarians
- data collected should provide administration with a tool for internal management and decision making.

Following publication of the Performance Measures report, two statewide projects were initiated to test out the measures (Clark, 1976; Powell, 1976). Both projects (in New Jersey and Illinois) recommended changes in procedures for gathering data and suggested additional resources. Several other adaptations of the original report and its recommendations were reported (Ramsden, 1978; Fairfield and Rowland, 1978; Schrader, 1980-81).

Academic libraries also began to show concern for library outputs and how well libraries were serving the users. While libraries and librarians have long expressed concerns for their users, it was not until the mid 1970's that a movement to study library users and library use started to build. For example, issues and concerns voiced at the 1976 Conference on Resource Sharing in Libraries (Kent and Galvin, 1977), held in Pittsburgh, included as a priority:

- the study of use of collections and relationship to cost
- study of user requests, user demand, user needs
- research on attitude adjustment of users, librarians and administrators

The expression of these issues and concerns was perceived as a major shift from a materials orientation to a user orientation. Burns (1978) writes:

> "In effect, these changes in operating philosophy mean that serious consideration must be given not only to what our users want but also to whom our proper users are. It suggests that the demands being placed upon the contemporary library are substantially more than the service it supplies, a fact that suprises no one. How to measure this differential as well as how to decide what constitutes an acceptable differential are key problems in measuring use and user satisfaction."

The Pittsburgh conference perhaps acted as a catalyst in bringing to the attention of academic librarians, the need for better and more relevant performance criteria and measures. Some time after this the Committee on ARL (Association of Research Libraries) Statistics began to explore the use of performance measures in academic and research libraries.

As stated by Richard Talbot, Chair of the Committee from 1980-82:

> "Most library managers would like to show how well their libraries satisfy their users, and how efficiently basic functions are performed. We are aware of operations management techniques which might answer these questions, but few, if any, of us have had the time and energy to pursue them. And the same can be said of our staffs. Operations management techniques have seemed either too recondite or to prove so little as to be irrelevant. Even when they seemed easily intelligible, the cost of data gathering and analysis seemed to outweight any possible benefit. What is needed are directly useful and easily intelligible measures of performance which can be economically applied."

With funding from ARL, Kantor developed four performance measures:

- availability of library materials
- accessibility of library materials
- analysis of patron activity
- delay analysis of specific activities.

These measures were tested by several ARL libraries and a manual for implementing the measures was published by ARL (Kantor, 1984).

In tracing the adoption of output performance measures, we were unable to acquire actual adoption or utilization data. However, such data should become available in the future as a result of efforts on the part of ALA/PLA to establish a clearinghouse for the measurement results. A tracing of output performance measures through the published literature (see Figure 11), however, shows a somewhat different diffusion pattern from those for bibliographic utilities and online database searching. Our interpretation of this pattern is that prior to 1981 most of the literature discussed the need for such measures. After the publication of the PLA report and the ARL report in 1982 and 1984 respectively, the literature began to discuss implementation experiences and consequences.

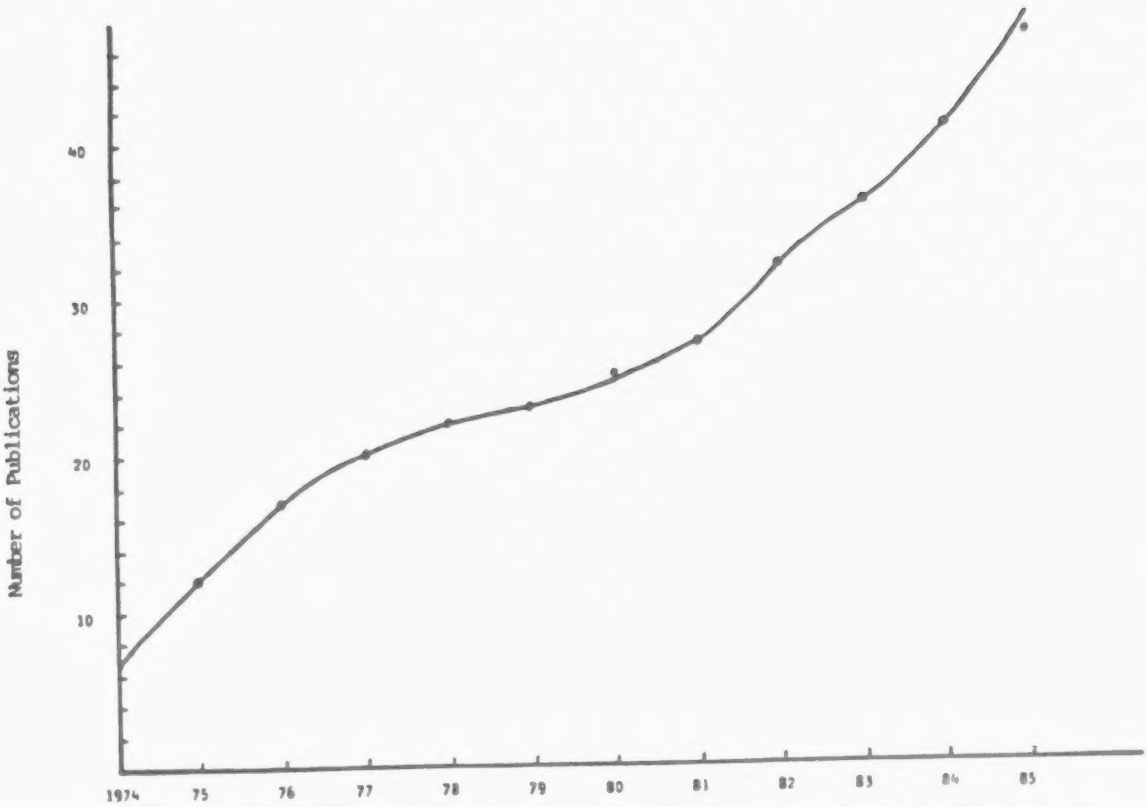


Figure 11. Cumulative number of publications as Output Performance Measures, by Year

SECTION 5

INDIVIDUAL CASE STUDIES OF INNOVATION ADOPTION AND USE

5.1 Methodology

Once the three innovations had been selected it was necessary to select the sites to be visited. It was at this point that the constraints of the RFP were felt in that we were unable to conduct a statistical survey because of OMB regulations. Instead, we proposed to conduct a series of case studies of innovation adoption and utilization. As these innovations, bibliographic utilities, online searching and output performance measures had been selected, it was decided to limit the study to those types of libraries that had demonstrated a critical mass of adoption, as evidenced by the literature review. Only three of the four main classes of libraries demonstrated such a mass: academic, public and special libraries. This excluded school libraries from our study design. This exclusion was thoroughly discussed by the Advisory Committee and Department of Education representatives who, after careful deliberation, supported the decision.

We used a Latin-square design for selecting sites for case studies. The Latin-square designed was 3x3x3 with innovation type, library type and innovation stage as the three dimensions of the square. The actual selection of libraries to fill cells of the matrix was from various published directories.

For our purposes, we needed to be able to choose a sample comprised of three different types of libraries in the U.S.: academic, public, and special. The libraries in the sample had to be geographically distributed across the U.S. Also, we needed to be able to break down the libraries in the sample by some criterion/criteria of size, e.g., book volumes held, professional staff, annual budget, etc. Then, we had to determine whether or not the library had adopted any or all of the following innovations:

- online searching
- bibliographic utility
- output performance measures

Furthermore, the timing of the innovation adoption was extremely important (i.e., early in the life of the innovation, middle of the life of the innovation, late or non-adoptor of the innovation).

Three directories were used to select the sample:

American Library Directory. 36th ed. Edited by Jacques Catell Press. New York: Bowker, 1983.

Directory of Special Libraries and Information Centers. 8th Edition. Edited by Brigitte T. Darnay. Detroit: Gale Research Company, 1983.

World Guide to Libraries. 6th Edition. Edited by Helga Lengenfolder. New York: K.G. Saur, 1983.

In addition to using these directories, we were able to acquire information from the developers of the innovations about those libraries that had participated early in the development and/or implementation of the innovations.

Each of the libraries initially selected, either from the directories or from the developers was contacted by telephone and screened for eligibility. In each instance we interviewed the library director and briefly explained the purpose of the study. The director was then asked if the library had adopted any of the three innovations to be studied and, if so, when. We then asked whether or not a staff person who had been involved in the decision to adopt the innovation(s) was still employed by the library to establish the presence of at least one "key informant" at each library. Finally, the directors were asked if they would be willing to participate in the study by hosting a one-day site visit. Copies of these screener questionnaires are included in Appendix A.

Each library that fulfilled our criteria of having adopted an innovation, having a key informant on site and being willing to participate in the study was entered into a "candidate pool" for further investigation.

Using this pool as a base we began to fill in the matrix with candidate libraries. Some care was taken to ensure a representative geographic distribution of libraries. Once the matrix had been completed, we recontacted the selected libraries to arrange the site visits. In cases where directors changed their minds about participation or the timeframe for data collection was inconvenient, we replaced selected libraries with other libraries fulfilling the case criteria from the candidate pool. The final site selection matrix that was produced is displayed in Figure 12. Note that each library that appears in a cell of the matrix was considered a primary case study library for that particular cell. All libraries were interviewed about each of the three innovations and thus additional cases were considered as secondary cases.

Each of the sites to be visited was sent a brief questionnaire prior to the visit. This questionnaire was to gather some background information about the library including organization chart, annual budget and source of funds, population served and any special needs, annual statistics on library usage (in terms of circulation, reference requests and visits), collection size, services offered, and educational background of staff. A copy of the previsit questionnaire is included in Appendix A.

The next step in the study process was the development of an interview guide for structuring the discussions at each site. The interview guide was developed using the preliminary model and set of hypotheses (see Section 2).

The guide is divided into five main sections as follows:

- Characteristics of libraries
- Characteristics of key persons
- Narrative history of the adoption process (for each innovation)
- Continuation/Routinization (for each innovation)
- Outcomes (for each innovation)

The characteristics of libraries included a discussion of the organization chart, a discussion of how decisions are made within the library, an assessment of the library's overall orientation towards service provision (ranging from reactive to proactive) and an assessment of the supervisory style within the library as a whole (ranging from very close to very loose).

Figure 12

DIFFUSION OF INNOVATIONS SITE SELECTION MATRIX

INNOVATION TYPE		TYPE OF LIBRARY Academic	 Public	 Special
BIBLIOGRAPHIC UTILITIES	E	Roesch Lib., U. of Dayton Mr. Narker (513) 229-4214 Dayton, OH	King County Lib. System Mr. Mutschler (206) 344-7465 Seattle, WA	Xerox Corporation Ms. Lavendel (415) 494-4042 Palo Alto, CA
	M	Himmelfarb Hlth. Sci. Lib., George Washington University Ms. Bader (202) 676-2927 Washington, D.C.	Seattle Public Library Mr. Dubberly (206) 625-4931 Seattle, WA	Philadelphia Mus. of Art Lib. Ms. Sevy (215) 763-2100 Philadelphia, PA
	L/N	Law Library St. John's University Ms. Bader (202) 676-2927 Washington, D.C.	Bellingham Public Library Ms. McCain (206) 676-6860 Bellingham, WA	Church Lib., Northwestern Univ. Medical School Ms. Kramer (312) 649-8133 Chicago, IL
ONLINE SEARCHING	E	Himmelfarb Hlth. Sci. Lib., George Washington University Ms. Bader (202) 676-2927 Washington, D.C.	San Jose Public Library Mr. Fletcher (408) 277-4822 San Jose, CA	Life Science Library A.D. Little Ms. Miller (617) 864-5770 X 2002 Cambridge, MA
	M	Church Lib., Northwestern Univ. Medical School Ms. Kramer (312) 649-8133 Chicago, IL	Seattle Public Library Mr. Dubberly (206) 625-4931 Seattle WA	Xerox Corporation Ms. Lavendel (415) 494-4042 Palo Alto, CA
	L/N		J. Lewis Crozier Library Ms. Maguire (215) 494-3454 Chester, PA	Veteran's Administration Central Office Library Ms. Tatman (202) 389-2781 Washington, D.C.

Key
E = early adopter
M = mid-adopter
L/N - late adopter or [illegible] adop [illegible]

Figure 12 (Cont'd.)

DIFFUSION OF INNOVATIONS SITE SELECTION MATRIX

INNOVATION TYPE		TYPE OF LIBRARY		
		Academic	Public	Special
OUTPUT MEASURES	E	Bio-Medical Library University of Minnesota Ms. Forman (612) 373-5585 Minneapolis, MN	Baltimore County Pub. Lib. Mr. Molz (301) 296-8500 Towson, MD	Hewlett-Packard Corporation Mr. Petru (415) 857-3092 Palo Alto, CA
	N	Roesch library University of Dayton Mr. Nartker (513) 229-4214 Dayton OH	Redwood City Pub. Lib Mr. Vollmayer (415) 369-6251 Redwood City CA	Life Science Library A.D. Little Ms. Miller (617) 864-5770 X 2002 Cambridge, MA

Key
E = early adopter
N = non-adopter

The characteristics of key persons that were gathered included first a description of their educational backgrounds, including all academic degrees earned, year in which they were awarded, and institution from which they were awarded. Then, we asked the interviewers to describe themselves as librarians using the five adjectives they considered best characterized them. This exercise was repeated a second time for a description/characterization of the library staff as a whole.

The remainder of the interview focussed on each of the three innovations in turn. For each innovation, information on current level of use was solicited. Level of use was defined at 12 different levels ranging from incomplete awareness of the innovation or its implications at the low end, to more-or-less continuous use at the top end of the scale.

The narrative history of the adoption process was the main focus of the interview and was subdivided into the five main stages in the adoption process:

- Stage 1. Awareness
- Stage 2. Serious Interest/Evaluation
- Stage 3. Initial Acquisition/Trial
- Stage 4. Integration
- Stage 5. Diffusion

The respondents were asked to describe the entire adoption process, stage by stage, indicating when the stages occurred, who was involved, what happened, why, and what were the outcomes. Any particular circumstances that made the adoption process more difficult or easier were discussed.

The next segment of the interview was concerned with the integration of the adopted innovation into the daily operation of the library. First we asked whether any significant modifications or adaptations had been made to the innovation since its implementation at the library. Then we asked a series of questions about the level of commitment to continued use of the innovation. Such commitment could be manifested in a number of different ways including being incorporated into the annual operating budget, description in publicity materials of the library, altering of roles and duties of library staff to incorporate the innovation, alterations to the facility or space allocation (if appropriate), and alterations to hiring and training requirements for staff. From this set of questions, we were able to develop a continuation/routinization score on a scale of 0 to 7, with 0 representing no commitment to continuation and 7 representing a significant commitment to the innovation.

The next segment of the interview was concerned with developing an operational profile of the innovation at each library. The profile was, in essence, an indicator of the extent of use of the innovation and, therefore, the scales varied by innovation type as the variety of functions and features varied substantially from innovation to innovation. For each feature identified (see the Interview Guide in Appendix A) we determined whether it was currently in use, had been considered but was not yet used, had previously been used but had been discontinued, or had never been considered at all. These four categories were then used to weight the responses (by functions of 3, 2, 1, 0) to each feature or function so that an overall level of use score could be produced. The actual scores were then divided by the maximum potential score so that for all three innovations the level of use ranged from 0 to 100 percent.

The final segment of the interview focussed on outcomes of the adoption process. Most of the discussion revolved around perceptions of benefits (to the respondent, the library, the user community) and costs (social costs, opportunity costs and financial costs). In summing up, the respondents were asked to indicate their perceptions of the relative advantage of adoption in terms of the time periods from adoption to the present, ahd for the next five years.

The interview guide was pretested at three sites to ensure that we were able to complete the interviews within a reasonable time frame, and that we were able to gather the information needed. The pretest responses have been included in our overall analyses.

5.2 Individual Case Studies

A total of 18 libraries were visited. However, a case study was not defined by the library visited but by the innovation being discussed. With the potential for three innovations per library visited we had the potential for 54 individual case studies. In actual fact, we gathered information for a total of 49 case studies. Applying these 49 completed case studies to the Latin-square design yields the matrix displayed in Figure 13. Descriptions of most of the case studies are included in Appendix C.

5.2.1 Library and Personal Characteristics Identified through the Case Studies

When we examine information on library and personal characteristics provided by our diffusion of innovation data collection sites, no sharp patterns emerge. Consistencies in certain areas, however, do appear.

In terms of the educational background of key persons and amount of time spent reading professional library and information science literature by key persons, there seems to be a substantial degree of conformity among the libraries. All key persons had MLS degrees, as shown in Figure 14. On the other hand, the majority of key persons did not possess "subject" Master's degrees or Doctoral degrees. (This general absence of higher degrees in addition to MLS does not appear to differ by type of library and could perhaps be a function of the demands of the library labor market at the time at which these key people became library directors.) Exceptions include two sites whose directors have earned Doctoral degrees, four sites whose directors have earned or are in the process of earning "subject" Master's degrees, and one site where the director had completed a management course in addition to the MLS. Time spent reading professional library and information science literature clusters, in the majority of cases, around two to four hours per week (Figure 15). Notably different from this were three sites: one academic health sciences library whose director spent approximately six hours per week reading professional literature, one public library whose director read local material approximately 10 percent of the time, and one public library whose director spent only

Figure 13

DIFFUSION OF INNOVATIONS CASE STUDY MATRIX

INNOVATION TYPE		TYPE OF LIBRARY		
		Academic	Public	Special
BIBLIOGRAPHIC UTILITIES	E	U. of Dayton Library	King County Library System San Jose Public Library	Xerox Corp., Library Veteran's Admin. Central Library
	M	St. John's U. Main Library George Washington U. Med. Lib. U. of Minnesota - Biomed. Lib	Seattle Public Library Crozier Library (Chester Co., PA)	Phila.Mus. of Art Library Arthur D. Little, Inc., Library Hewlett Packard Corp. Library
	L/N	St. John's U. Law Library Northwestern U. Med. Lib.	Bellingham Public Library Redwood City Public Library Baltimore County Public Library	
ONLINE SEARCHING	E	George Washington U. Med.Lib. U. of Minnesota - Biomed. Lib.	San Jose Public Library	Hewlett Packard Corp., Library
	M	U. of Dayton Library St. John's U. - Main Library Northwestern U. - Med. Lib.	Seattle Public Library	Xerox Corp., Library Arthur D. Little, Inc., Library
	L/N		King County Library System Bellingham Public Library Redwood City Public Library Crozier Library (Chester Co., PA) Baltimore County Public Library	Phila. Museum of Art Library Veteran's Admin. Central Library

Key
E = early adopter
M = mid-adopter
L/N = late adopter or non-adopter

Figure 13 (Cont'd.)

DIFFUSION OF INNOVATIONS CASE STUDY MATRIX

INNOVATION TYPE		TYPE OF LIBRARY		
		Academic	Public	Special
OUTPUT MEASURES	E	U. of Minnesota - Biomed. Lib.	King County Library System Seattle Public Library Bellingham Public Library San Jose Public Library Crozier Library (Chester Co., PA) Baltimore County Public Library	Hewlett Packard Corp., Library
	N	U. of Dayton Library Northwestern U. - Med. Lib.	Redwood City Public Library	Xerox Corp., Library Phila. Museum of Art Library Arthur D. Little, Inc., Library

Key
E = early adopter
N = non-adopter

Figure 14

Library Name	Educational Background of Key Person(s)
Roesch Library, University of Dayton	(1) MLS (2) Dr. of Letters in Germany, Library Science Diploma (Vatican Library School) (3) MLS (4) MLS + MS in Education
King County Library System	MLS + MA in History
Xerox Corporation	MLS, MBA (1983), Ph.D. in Classics
Seattle Public Library	MLS
Philadelphia Museum of Art Library	MLS
Main Library, St. John's University	MLS, MS in Education, Ed.D. (1980)
Bellingham Public Library	MLS
San Jose Public Library	MLS + Management course
Church Library, Northwestern University	MLS
Crozier Library	MLS
Baltimore County Public Library	(1) MLS (2) MLS
Bio-Medical Library, University of Minnesota	MLS, MPH almost completed
Hewlett-Packard Corporation	MLS
Redwood City Public Library	MLS

Figure 15

Library Name	Professional Reading Habits
Roesch Library, University of Dayton	(1) 2-3 hours/week (2) 4-5 hours/week
King County Library System	3-4 hours/week
Xerox Corporation	no information available
Seattle Public Library	1 hour/week, read more managerial stuff: AMA planning type stuff
Philadelphia Museum of Art Library	2 hours/week
Main Library, St. John's University	3 hours/week maximum
Bellingham Public Library	3 hours/week
San Jose Public Library	reads local materials 10% of time
Church Library, Northwestern University	6 hours/week
Crozier Library	2-3 hours/week
Baltimore County Public Library	(1) 5 hours/week (2) 4 hours/week
Bio-Medical Library, University of Minnesota	2 hours/week
Hewlett-Packard Corporation	lot of scanning - at most 2 hours/ week - route journals through staff
Redwood City Public Library	3 hours/week

one hour per week on professional library and information science literature but who read more "managerial - AMA planning type" literature. Yet another site reported that its director did a lot of scanning and spent a maximum of two hours per week reading.

Overall, service orientation among the libraries was described more often as neutral or closer to "pro-active" than to "reactive" (Figure 16). No sites stated that their orientation towards provision of service could be classed as "reactive" and only two sites (one public and one special library) called their orientation "somewhat more reactive" on a scale that runs from (1) reactive, to (2) somewhat more reactive, to (3) some of both, to (4) somewhat more pro-active, ending at (5) pro-active. Four libraries (one academic and three public) stated that their service orientation was both somewhat reactive and somewhat pro-active. "Somewhat more pro-active" was used by four libraries (one academic, one public, and two academic health science libraries) to describe their service orientation. Yet another four libraries (evenly split between special and public libraries) described their orientation as pro-active.

The characteristic of supervisory style (shown in Figure 17) among the libraries also showed tendencies towards uniformity in that, for all libraries except one, the supervisory styles ranged from neither close nor loose to very loose. On a scale running from: (1) very close, to (2) somewhat close, to (3) neither loose nor close, to (4) somewhat loose, and ending with (5) very loose, none of the libraries stated that their supervisory style was "close", and the one library that gave "very close" as a description of the supervisory style stated that it was "very participatory at the same time". The majority of libraries stated that the supervisory style was somewhat loose. That this is the case may be quite important for our study of diffusion of innovation in libraries. In a related study on resistance to technological innovation in libraries, Sara Fine notes that close supervision was "related to the tendency to be resistant" (Resistance to Technological Innovation in Libraries: Part III: Reviews of the Study, pp. 9 and 22).

Figure 16

Library Name	Service Orientation
Roesch Library, University of Dayton	somewhat reactive and somewhat pro-active
King County Library System	somewhat reactive and somewhat pro-active
Xerox Corporation	pro-active
Seattle Public Library	philosophically, somewhat more pro-active (City Hall Library = pro-active)
Philadelphia Museum of Art Library	somewhat more reactive
Main Library, St. John's University	somewhat more pro-active
Bellingham Public Library	somewhat reactive and somewhat pro-active
San Jose Public Library	pro-active
Church Library, Northwestern University	between somewhat more pro-active and pro-active
Crozier Library	somewhat more pro-active
Baltimore County Public Library	somewhat reactive and somewhat pro-active
Bio-Medical Library, University of Minnesota	somewhat more pro-active
Hewlett-Packard Corporation	pro-active
Redwood City Public Library	somewhat more reactive

Figure 17

Library Name	Supervisory Style
Roesch Library, University of Dayton	neither close nor loose
King County Library System	somewhat loose
Xerox Corporation	very close (at same time, very participative)
Seattle Public Library	somewhat loose
Philadelphia Museum of Art Library	very loose
Main Library, St. John's University	somewhat loose
Bellingham Public Library	somewhat loose
San Jose Public Library	very loose
Church Library, Northwestern University	neither close nor loose "participatory dictatorship"
Crozier Library	neither close nor loose "I encourage initiative"
Baltimore County Public Library	somewhat loose
Bio-Medical Library, University of Minnesota	somewhat loose
Hewlett-Packard Corporation	very loose, "manage by objective - how they do it is their own business"
Redwood City Public Library	neither close nor loose

Substantially more variety is evident in the adjectives chosen by key persons to characterize themselves as librarians. Self-characterizations chosen by the key persons (approximately five per key person) were:

service-minded
open-to-suggestions
interested in reading
interested in new things
like to delegate responsibility
proactive
numerical
good administrator
innovative in my own tiny sphere
helpful to clients/students
friendly
very approachable
open
determined
fighter
risk-taker/leading
active
trouble-shooter
committed
strongly rely on middle management
flexible
fair as a supervisor
hard-working
unconstrained by tradition
relatively fearless
results-oriented
impatient
a wheel inventor
politically pragmatic
against fees
good librarian
share authority
optimistic
like working with people
aggressive
articulate
enthusiastic
receptive to staff suggestions
careful but impulsive
cooperative
knowledgeable about library matters
positive
knowlegeable
not typical librarian (not meek)
public service-oriented
unconventional
adventurous
a fire-ball
curious about new things
conscientious
willing to try new things
cooperative and supportive
adventuresome
encouraging to others
eager to learn
service-oriented
hard-driving
philosophical
outreach oriented to profession
future-oriented
good at public relations - reporting on library to others
a lot of confidence and respect for people who work for me
unknowledgeable of latest innovations

Occasionally, the same self-characterization was given more than once, e.g., optimistic, friendly, open, and committed. Moreover, many self-characterizations, although not identical, were not dissimilar:

service-minded/service-oriented/public service-oriented

open-to-suggestions/receptive to staff suggestions

share authority/like to delegate responsibility

interested in new things/willing to try new things/curious about new things

cooperative/cooperative and supportive

knowledgeable/knowledgeable about library matters

determined/committed

unconventional/unconstrained by tradition

adventurous/adventuresome

encouraging to others/cooperative and supportive

optimistic/positive

These self-characterizations, not surprisingly, are overwhelmingly positive. In some instances, the expressions chosen suggest that the key persons view themselves as "leaders and explorers", for example:

interested in new things/willing to try new things/curious about new things

innovative in my own tiny sphere
proactive, future-oriented

risk-taker/leading

adventurous/adventuresome

a wheel inventor

unconstrained by tradition/unconventional

leader - can direct and motivate staff

However, more frequent were instances in which key persons referred to themselves in terms of their characteristics as professional librarians in more familiar, expected ways:

service-oriented/public service-oriented/service-minded
interested in reading
like working with people
helpful to clients and students
friendly
cooperative
good librarian
good at public relations - reporting on library to others
conscientious
hard-working

Key persons' characterizations of their library staff as a whole (approximately five per person) represent an assortment and are generally complimentary:

service-oriented
friendly
pride in organization
intelligent
very service-oriented
energetic
very knowledgeable
very dedicated (philosophically)
hardworking
traditionalists - dichotomy
diligent
don't give up in their searches
competent
implementers, not creators
talented
fighters
excellent
eager to learn
I'm very proud of them

interested in bettering selves
devoted to their work
willing to try new things
helpful
cooperative
clever
work as a team (team-minded)
book-oriented
parochial - provincial
enthusiastic
knowledgeable
very knowledgeable in their fields
fussy-particular
private: committed 9 to 5
very public service-oriented
leaders
good librarians
eager to do, keep up in profession
dedicated

workaholic
flexible
comfortable
work well together
generally hardworking
work well with networks regionally
unconstrained by tradition
combination hardworking and lazy
slaves to job/dedicated beyond 9 to 5
willing to suggest innovative approaches
cooperative with each other, users and me
people-oriented rather than goal-oriented
care about library, work environment, services provided

loyal
responsible
innovative
cohesive
complacent
adventuresome
encouraging to others
want change/afraid of change

As was the case with self-characterizations, occasionally the same adjective/expression was given more than once, i.e., service-oriented, friendly, willing to try new things, intelligent, cooperative, energetic, hardworking, competent, and flexible. Moreover, many characterizations ascribed to the library staff as a whole, although not identical, were not dissimilar:

service-oriented/very service-oriented/very public service-oriented
interested in bettering selves/eager to do, keep up in profession
willing to suggest innovative approaches/innovative
cooperative/cooperative with each other, users and me
knowledgeable/very knowledgeable/very knowledgeable in their fields
hardworking/generally hardworking/diligent

For the most part, key persons characterized their library staff as whole in favorable ways. In some instances, the expressions chosen suggest that the key persons view their staff as either potentially "leaders and explorers" or clearly not as "leaders and explorers", for example:

willing to try new things
willing to suggest innovative approaches/innovative
leaders
eager to do, keep up in profession

unconstrained by tradition
adventuresome

versus

book-oriented
traditionalists-dichotomy
implementers, not creators
complacent
want change/afraid of change.

Not unexpectedly, however, key persons referred to their library staff as a whole as professional librarians in more familiar, expected terms more frequently:

service-oriented/very service-oriented/very public service-oriented
friendly
devoted to their work
pride in organization
intelligent
helpful
cooperative
knowledgeable/very knowledgeable/very knowledgeable in their fields
very dedicated (philosophically)
hardworking/generally hardworking/diligent
cooperative/cooperative with each other, users, and me
don't give up in their searches
slaves to job/dedicated beyond 9 to 5
competent
excellent
good librarians
dedicated
workaholic
loyal
flexible
people-oriented rather than goal-oriented
responsible
care about library, work environment, services provided.

Contrasting key persons' self-characterizations with their characterizations of their library staffs as a whole (as shown in Figure 18), we find that, in some cases, key persons (library directors) applied some of the adjectives they had used to characterize themselves to their staff as a whole. Examples include:

service-oriented
friendly
enthusiastic
cooperative
fighters
flexible
willing to try new things
adventuresome*
unconstrained by tradition*
encouraging to others*
relatively fearless*
eager to learn*

Only once did the key person in a data collection site library apply all of the characterizations to his/her staff as a whole that he/she had applied to him/herself (as indicated above by an asterisk). When a key person ascribed some of his/her self-characterizations to his/her staff as a whole, more familiar expressions characterizing professional librarians, e.g., "service-oriented", "friendly", "enthusiastic", and "cooperative" appeared to be used less sparingly than those that convey less expected qualities, e.g., "fighters", "willing to try new things".

5.2.2 Analysis of Innovative Versus Non-Innovative Libraries

As mentioned earlier, a total of 18 libraries were visited during this study and yielded a total of 49 case studies. The first analysis performed was to attempt to distinguish between innovative and non-innovative libraries. The strongest indicator of "innovativeness" was stage of adoption so that early adopters of innovations are assumed to be

Figure 18

Library Name	Self-Characterization Adjectives	Library Staff as a Whole Characterization Adjectives
Roesch Library, University of Dayton	Service-minded Open to suggestions Share authority Interested in reading Friendly	Service-oriented Interested in bettering selves Friendly Devoted to their work
King County Library System	Optimistic Interested in new things Like working with people Like to delegate responsibility I don't ride them after it is delegated	Pride in organization Willing to try new things Willing to suggest innovative approaches Intelligent Friendly Helpful Very service-oriented
Xerox Corporation	Aggressive Pro-active Articulate Numerical Optimistic	Cooperative Energetic Clever Very knowledgeable Work as a team (Team-minded)
Seattle Public Library	A wheel inventor Philosophical Politically pragmatic Outreach, oriented to profession Against fees Future-oriented	Very dedicated (philosophically) Book-oriented Hardworking Parochial-provincial (local pride) Traditionalists - Dichotomy (Downtown: subject-oriented Branches: community-oriented)
Philadelphia Museum of Art Library	Enthusiastic Good administrator Receptive to staff suggestions Innovative in my own tiny spehere Careful but impulsive too	Enthusiastic Diligent Knowledgeable Intelligent Cooperative with each other, users, and me
Main Library, St. John's University	Helpful (to clients and students) Cooperative Friendly Knowledgeable about library matters Very approachable	Helpful (to clients and students) Very knowledgeable in their fields Cooperative Don't give up in their searches Friendly Hardworking/slaves to jobs (Dedicated, not just 9 to 5)

Figure 18 (Cont'd.)

Library Name	Self-Characterization Adjectives	Library Staff as a Whole Characterization Adjectives
Bellingham Public Library	Positive Knowledgeable Open Determined A lot of confidence and respect for people who work for me	Competent Cooperative Fussy-particular Implementers, not creators Private: committed to library 9 to 5
San Jose Public Library	Not a typical librarian (not meek) Fighter Open Public service-oriented Risk-taker/leading	Talented Energetic Very public service-oriented Fighters Leaders
Church Library, Northwestern University Medical School	Good librarian Leader - can direct & motivate staff Good teacher Good at public relations - reporting on library to others Innovative	Excellent Good librarians Innovative Eager to learn Eager to do, keep up in profession I'm very proud of them
Crozier Library	Unconventional Active Adventurous Trouble-shooter A Fire ball (how board member describes me)	Dedicated Work-a-holic Loyal Flexible People-oriented rather than goal-oriented
Baltimore County Public Library	Committed Curious about new things Unknowledgeable on latest innovations Strongly rely on middle management	Energetic Competent Comfortable Responsible Innovative
Bio-Medical Library, University of Minnesota	Conscientious Flexible Willing to try new things Fair as a supervisor Cooperative and supportive Hardworking	Flexible Willing to try new things Professionally active Friendly Work well together Cohesive Generally hardworking Work well with networks regionally

Figure 18 (Cont'd.)

Library Name	Self-Characterization Adjectives	Library Staff as a Whole Characterization Adjectives
Hewlett-Packard Corporation	Adventuresome Unconstrained by tradition Encouraging to others Relatively fearless Eager to learn	Adventuresome Unconstrained by tradition Encouraging to others Realtively fearless Eager to learn
Redwood City Public Library	Results-oriented Service-oriented Impatient Committed Hard-driving	Service-oriented Complacent Want change/afraid of Change Combination hardworking/lazy They care about their library, their work environment, what services they provide

more innovative than later adopters. The following scoring scheme was developed:

Early adoption: 3 points
Mid-adoption: 2 points
Late adoption: 1 point
Non-adoption: 0 points

Using this scheme, with each library having a potential maximum score of 9 points (3 points for early adoption of each of the 3 innovations investigated) we defined three classes of "innovativeness" as follows:

Very Innovative: 7-9 points
Fairly Innovative: 4-6 points
Not Innovative: 1-3 points

Applying these criteria to the 18 libraries visited yielded the following groups:

Very Innovative (7-9 points)
- San Jose Public Library
- University of Minnesota Biomedical Library
- Hewlett Packard Corporation, Corporate Library
- King County Library System
- Seattle Public Library

Fairly Innovative (4-6 points)
- University of Dayton Library
- St. John's University Main library
- Himmelfarb Health Sciences Library, George Washington University
- Bellingham Public Library
- Crozier Library (Chester, Pennsylvania)
- Baltimore County Public Library System
- Xerox Corporation, Palo Alto Research Center Library
- Arthur D. Little, Inc., Research Library
- Veterans Administration Central Library

Not Innovative (1-3 points)

St. John's University Law library
Northwestern University Medical School Library
Redwood City Public Library
Philadelphia Art Museum Library

These categories can now be used to analyze the characteristics of very innovative, fairly innovative and non-innovative libraries.

The average annual budgets of libraries in the three categories are as follows:

Very Innovative: $5,896,977
Fairly Innovative: $3,201,567
Not Innovative: $ 751,402

Clearly, library budget is a factor which influences a library's ability to innovate at an early stage, particularly as most innovations require a considerable amount of staff time to implement.

The average population served by each library in each of the three classes are as follows:

Very Innovative: 384,025
Fairly Innovative: 152,882
Not Innovative: 23,047

At first sight these results may be as expected considering the average annual budget of libraries in the three categories. However, if the average budget per person in the population/community served is calculated, the very innovative libraries have the lowest per capita budget and the non-innovative libraries the highest as follows:

Very Innovative: $15.36 per capita per year
Fairly Innovative: $20.94 per capita per year
Not Innovative: $32.60 per capita per year

In considering the average annual circulation for libraries in each of the three groups the very innovative libraries have the highest average and the not innovative libraries the lowest, as indicated below:

Very Innovative: 2,044,727 average annual circulation
Fairly Innovative: 1,886,888 average annual circulation
Not Innovative: 178,753 average annual circulation

However, as in the previous analysis, if we look not at total annual circulation statistics but at average circulation per capita figures, a different pattern emerges as follows:

Very Innovative: 5.32 average annual circulation transactions per capita

Fairly Innovative: 12.34 average annual circulation transactions per capita

Not Innovative: 7.76 average annual circulation transactions per capita

The average annual number of reference requests to libraries in each of the three categories is:

Very Innovative: 209,028
Fairly Innovative: 116,624
Not Innovative: 24,096

However, the average annual number of reference requests per person in the population/community served is:

Very Innovative: 0.54 average annual reference requests per capita

Fairly Innovative: 0.76 average annual reference requests per capita

Not Innovative: 1.05 average annual reference requests per capita

The total average number of visits made annually to libraries in each of the three groups is:

Very Innovative: 1,178,350
Fairly Innovative: 218,873
Not Innovative: 174,516

As before, looking at the average annual visits one per capita basis yields the following results:

Very Innovative: 3.07 visits per capita per year
Fairly Innovative: 1.43 visits per capita per year
Not Innovative: 7.57 visits per capita per year

The average size of library collections, measured in terms of total numbers of volumes (items) held, for libraries in each of the three categories is as follows:

Very Innovative: 798,687
Fairly Innovative: 592,488
Not Innovative: 256,258

The average collection sizes per capita for the same groups of libraries are as follows:

Very Innovative: 2.08 volumes per capita
Fairly Innovative: 3.88 volumes per capita
Not Innovative: 11.12 volumes per capita

One of the most interesting results is the total number of services offered by the libraries in the three groups. Using a predefined list (see the Previsit Questionnaire in Appendix A) the libraries could identify a maximum of 15 services. The average for each group was:

Very Innovative: 12.25
Fairly Innovative: 8.8
Not Innovative: 9.5

None of the above sets of statistics identifies a cause and effect relationship. However, they are provided as a context within which all our subsequent analyses fall.

In analyzing how adoption decisions were made and how key decisions are generally made in the three groups of libraries, some differences were observed from group to group. The very innovative group often involved a group process with staff from all levels in the library. This was so in all but one case, which made decisions through a senior management group -- department heads plus director. The fairly innovative libraries generally made their decisions through similar senior management groups. The non-innovative libraries usually had all decisions made by the director alone.

The groups of libraries showed different perceptions of their philosophy of service provision. Using a scale of 1 to 5, with 1 representing a reactive philosophy and 5 representing a proactive philosophy, the three groups averaged:

Very Innovative: 4.4
Fairly Innovative: 4.1
Not Innovative: 2.7

The libraries were also asked to provide a subjective ranking of their overall supervisory style. Again using a scale of 1 to 5, with 1 representing a very close style and 5 representing a very loose style, the libraries in the three groups averaged:

Very Innovative: 4.4
Fairly Innovative: 3.2
Not Innovative: 3.7

Another factor we studied was the amount of professional reading per week by each of the key informants (usually the library director). Libraries in the three groups averaged:

Very Innovative: 2.5 hours per week
Fairly Innovative: 2.7 hours per week
Not Innovative: 3.6 hours per week

This result may seem surprising at first glance. However, as we demonstrate later in the section, many of the early innovators rely on interpersonal contacts with other professionals through professional meetings, committee assignments, and so on. Perhaps the most innovative individuals are plugged into informal networks and do not have to spend as much time reading. On the other hand, non-innovators may be reading more heavily in an effort to "catch up".

5.3 Cross Case Analysis by Innovation Type

In reviewing the case studies we defined three types of cross case analyses:

- by innovation
- by type of library
- by time of adoption

In each case we wanted to investigate certain questions as follows:

1. Cross-site adoption pattern: When was the true beginning of this innovation?

    1.1 Is it clear? Was there a long development phase?

    1.2 How far has diffusion progressed in general?

    1.3 Where do our sample sites fit in overall pattern? (e.g., Are they all fairly early? Were any also involved in development?)

    1.4 Has innovation been fast, slow, linear, curvilinear?

2. Adoption Process Stages:

    2.1 Are there distinct stages? Are these more-or-less as hypothesized?

    2.2 Do early, middle, and late adopters follow the same stages? Or are different stages more important for early versus later adopters?

2.3 Do early, middle, late adopters do different things at each stage?

2.4 Are different people involved at different stages?

2.5 Are different barriers/facilitators important at different stages?

2.6 Are there library characteristics differences which may account for different patterns (apart from being early, middle, late)?

3. Adaptations: Do libraries make significant adaptations? Are they unique to their site?

3.1 Unique to being early, middle, late adopters?

3.2 Do adaptations weaken, strengthen the innovation?

3.3 Is adaptation a natural part of the process of coming to terms with the innovation?

3.4 Do libraries and staffs adapt to the innovation as much as vice versa?

4. Do similar barriers appear across sites?

4.1 How much do barriers appear to be a function of the innovation characteristics (intrinsic)?

4.2 How much a function of the stage of innovation?

4.3 How much a function of the type of library, size of library

4.4 How much a function of the fiscal issues?

4.5 How much a function of the attitudes, norms, of librarians?

4.6 How much a function of the percent organization?

5. Do similar facilitating factors occur across sites?

6/7. Does level of use or operational profile scale make much sense?

Are main features or use patterns similar across sites?

8. Do all sites see similar benefits?

    8.1 Do benefits vary with early, middle, late?

9. Do costs break out clearly in terms of social, opportunity, and financial?

    9.1 Are there commonalities across sites?

    9.2 Do cost patterns differ for early, middle, late?

10. Are there benefits to cost judgement differences related to early, middle, late?

    10.1 To number and type of barriers, facilitators?

11. Is continuation related to early, middle, late?

    11.1 Is it related to stated benefits, costs, barriers, facilitators, benefit/cost judgements?

12. Is amount of secondary diffusion related to early, middle, late?

    12.1 Are types of secondary diffusion related to early, middle, late?

    12.2 Does amount and type of secondary diffusion shed light on the nature, strength, of the informal innovation diffusion network (i.e., can we see how one type of site influences another?)?

5.3.1 Adoption of Bibliographic Utilities

The three major bibliographic utilities in the U.S. each began with a small number of libraries that participated in development, creating an active networks of users. All three centered their activities on the cataloging function (although BALLOTS, RLIN's predecessor, began with acquisitions, RLIN was predicated on shared cataloging). All three had similar developmental histories, including rough starts, implementation gliches, and organizational upheavals. Other factors made the difference for adopting libraries as they went about their selection. For example, OCLC, RLIN, and WLN developed at different times, in different regions, under different auspices, and with differing approaches to cataloging based on different philosophies about the purpose of the utility. The three utilities have different organizational arrangements and different criteria for membership as well. Finally, their packages of subsystem and service offerings, while now resembling one another quite a bit, have appeared to be quite dissimilar from one another at various points in their evolution.

Adding to the complexity of the picture is the feedback from adopters, which has had considerable influence on the respective utilities and probably counts for a great deal of the explanation of their convergence over time. In addition, the utilities pay attention to one another, tracking modifications over time. Finally, the utilities have no doubt taken into consideration the shifts in other library system vendors — of acquisitions, circulation, and especially integrated library systems -- as they plan and implement changes in their respective organizations.

The libraries in our study have monitored the developments in bibliographic utilities quite closely from the beginning, making their choices based on considerable information. In this section of the report, we want to describe how the similarities and differences among bibliographic utilities affected choice and therefore diffusion among the libraries in our sample.

We have data regarding choice of bibliographic utility from all 18 libraries including six academic libraries, seven public libraries, and five special libraries. Of these libraries, eight have adopted OCLC, four have adopted RLIN (and one library decided not to adopt RLIN), and three libraries have adopted WLN.

Four primary factors emerge as influencing the decision concerning which bibliographic utility to adopt. They are:

- Time or Origin
- Proximity

- Auspices and Criteria for Membership
- Approach to Cataloging

Each of these factors and their effects on adoption decisions by libraries is discussed below.

Time or Origin

OCLC, RLIN, and WLN all began at different times, with OCLC preceding the other two in general availability and in online format by several years. Of the eight libraries in our sample that adopted OCLC, all considered that utility to be the only choice. Of these, at least four adopted OCLC before the other utilities went online and became generally available. For the two sites that adopted OCLC not long after RLIN became available, OCLC's proven track record accruing from an earlier start-up time was a critical factor. As the respondent from one of these sites explained, "OCLC was proven. We are a private university with a small endowment. We are not in a position to be a groundbreaker. For the university administration, the library could point to pages of OCLC participants. . OCLC had more users and more subsystems. Intellectually RLIN wins over OCLC because of the authority file. But RLIN was limited to research libraries and was the new kid on the block."

Presumably institutions now considering affiliation with a bibliographic utility would not be weighing their decision in exactly this way, because the big three are now all well established.

These respondents' observations point out other characteristics of bibliographic utilities that began to influence choice: criteria for membership, number/type of services, and approach to cataloging. We will come back to these, but first we want to turn to another important factor, that of proximity.

Proximity

Perception of how close or far away a bibliographic utility is clearly affected both awareness and the decision to get involved both positively and negatively. An early adopting OCLC academic library was drawn to the idea of a local network. The public libraries joining WLN all mentioned its regional nature as a factor and that OCLC especially was "too far away". In like manner, the OCLC libraries, both in the east and in California felt WLN to be distant and OCLC to be closer. The early adopting RLIN special library sites gained early awareness of its development because of their locations near Stanford.

Auspices and Criteria for Membership

Each utility was developed under different auspices, a fact which has influenced potential adopters' perceptions of its proper clientele. Criteria for membership have in turn reinforced these perceptions. WLN has a reputation of being public library-oriented, which is appropriate since it was developed by public libraries. As the comments above make clear, RLIN, taken over by the RLG, is viewed as research library oriented. Public libraries in California, at least, appear not to have this image, perhaps because RLIN's earlier incarnation, BALLOTS, was developed by public libraries which remained members after RLG took over. RLIN continues to have both these and other public libraries and research libraries among its members, although the public libraries' participation is now brokered by an intermediary organization called CLASS (California Library Authority for Systems and Services).

OCLC appears to have the most diverse membership, including academic libraries, public libraries, special libraries, and school libraries. For example, health sciences libraries appear to feel at home in OCLC; one such site that is a user of RLIN by virtue of a decision of its parent main library felt that it would be much more appropriate to be a member of OCLC.

Special libraries appear to be drawn to RLIN as well as to OCLC. For the ones in our sample, time of origin and/or proximity explains many of their decisions, but for them as for others, particular approaches, manifested in subsystems and services, swayed the final choices.

Approach to Cataloging

RLIN's philosophy is based on shared cataloging and places highest value on a database of unique items usable for all members. In particular, the database is considered appropriate for joint collection development. For this reason, it developed its subject access feature. OCLC appears to have started from another premise, that of largely overlapping collections, with cataloging time being saved by having access through title and author. At least one special library chose RLIN over the other utilities because of its general system design relative to the adopting library's long-range plan to develop a searchable online catalog: "RLIN was being built to be downloaded and our (system) was being built to accept." At another level, RLIN's subject access capability was mentioned over and over as a very desirable design feature. The sheer number and variety of OCLC subsystems and services was very attractive to many adopters, especially the ones who came in after the very beginning. RLIN's search-only capability swung at least one public library into its camp at a time when OCLC was the obvious choice but did not have the search-only feature (and its associated lower cost access). The library in question needed to move gradually into cataloging because it had to move slowly out of another cataloging arrangement and perform its own cataloging for a while in-house. The search-only capability was invaluable at a time when full membership in a utility was impossible for financial and organizational reasons.

While the three utilities began as quite separate, different phenomena, the differences among them are beginning to diminish. Each has added features that another has had. For example, OCLC now has a search-only feature and is working on subject access. In some ways, they are now viewed as databases completely separate from the networking functions which membership offers. Several of the libraries we visited were in the process of, or had already acquired, search-only access to a second bibliographic utility for use in reference, interlibrary loan, etc. Membership loyalty has begun to diminish and is likely to decrease further as this occurs.

Early adopting and even middle adopting OCLC libraries may well switch allegiances from that utility, some to a more localized arrangement that offers the active network that OCLC was in the beginning, others to RLIN as they decide that it is now stabilized and appropriate to their needs, still others to an integrated library system that is designed for their individual needs. If in the beginning, the bibliographic utilities were like uniquely designed local union catalogs, their changing structure and function over time has made them look more like one another and more like regular databases, in terms of uniqueness versus universalism, competition versus cooperation, deliberate versus inadvertant lack of it. On the one hand, uniqueness makes utilities more desirable and, on the other hand, less desirable as adopter libraries seek to maintain flexibility of choice and manipulation.

1. Cross-Site Adoption Pattern

Eight libraries which were studied had adopted OCLC, a bibliographic utility created in 1968 to provide cataloging services to member libraries. The eight libraries are located in universities of which two are main libraries, one is a biomedical library, and one is a law library; two public libraries and two special libraries.

Of the eight libraries, one (Case Study 1) is a very early adopter that, in fact, participated in the development of OCLC. Two other libraries are also classified as early adopters (Case Studies 28, 49). Four (Case Studies 4, 10, 34, 46) are adopters that experienced rather prolonged initial stages. The last site (Case Study 7) is a late but relatively swift adopter of OCLC.

The RLIN adopters also present a varied adoption pattern. Two libraries adopted RLIN almost as soon as it became available in 1978 (Cases 40 and 52). Two libraries adapted in 1980 (Cases 16 and 43) and one in 1982 (Case 31).

The three libraries adopting, all public libraries, show very different patterns of adoption. Case 19 was among the original libraries in WLN and was involved to some degree in the development process. It appears to have become involved sometime between 1974 and 1976. Case 22 joined in 1980, while Case 25 has been involved only since 1982 and is only a partial adopter at that. Case 22 is the largest library in the region; its joining WLN may mark a coming of age for the bibliographic utility, greatly legitimatizing it. Case 25 is now the largest public library in the area not a full member of WLN; the major constraint is finances.

2. Adoption Process Stages

The libraries present very different adoption patterns. The early/development library (Case Study 1) learned that OCLC was being developed and moved quickly to become involved. It adopted OCLC as soon as the database went online in 1971, well before the utility expanded beyond the boundaries of Ohio. The two other early adopters joined later in 1975 and 1976 mainly because of leadership commitment to the utilities. In one of these cases, there was considerable pressure from outside the library to clear the cataloging backlog.

Case 10 joined OCLC on an experiemental basis in 1977. Another university in the area was acting as a processing center for several institutions, so Case 10 did not acquire its own terminal. At the time, OCLC was the only bibliographic utility available and it had "a fairly decent track record", according to the respondent at the library, so it was adopted. In the first year they used telefacsimile to send copy back and forth but discovered that it was not necessary, and by 1979, they were mailing copy instead. The push for shared cataloging came from the library directors of Case 10 and the processing university, who were committed to cooperative automation to minimize the burden on individual institutions.

This relatively smooth course was disrupted in 1979 when the fulltime cataloger in Case 10 left and the library director decided that the position was unnecesary and eliminated it. A clerk was put in charge of cataloging but did not understand its concept and was resistant to the OCLC process. The processing center also hired a new cataloger. The result was a year of problems and bad cataloging before the respondent was appointed head of technical services and became aware of the situation in 1980. By late 1981, Case 10 had acquired its own OCLC terminal and by 1982, there was once again a full-time cataloger. The respondent had to learn how OCLC operated and taught other staff as well. The decision to acquire a terminal came as the library realized it was using more subsystems and needed greater access, e.g., to be able to edit online. "It was obvious we needed our own terminal for the level of work we wanted to do." Complete adoption then occurred in 1981 as the terminal was installed. "It gave the staff a boost to have more control (over cataloging)."

Awareness of OCLC in Case 4 occurred as early as 1974 -- the library director and head cataloger visited an OCLC site — but did not move beyond that stage for several years as a result of the negative reaction of the head cataloger to the whole idea of a bibliographic utility. By 1977, there had been a significant shift of library administration. The assistant library director -- a newly created position — established working committees to consider, among other things, automation. Over the next several years, the automation committee studied all aspects of automation and decided to make cataloging the first priority for implementation. The committee prepared a formal report which was accepted by the university administration by mid 1980. The head cataloger had been ill much of this time, leaving the department leaderless, but allowing the committee to make progress with its work. By mid-1981, a new head cataloger with extensive experience in implementing OCLC had been hired and the first OCLC cards were produced. OCLC was chosen over RLIN because "OCLC was proven". This case involves a private university with a small endowment. "It is not in a position to be a groundbreaker. For the university administration, we could point to pages of OCLC participation. OCLC had more users and more subsystems. RLIN was the new kid on the block."

In contrast to the bumpy roads of Cases 10 and 4, Case 7, a small law library on the same campus as Case 4, decided to acquire OCLC in 1983, prepared the documentation needed by the university administration to support the proposal and was cataloging on OCLC by June of 1984. It had no pressing problem in the cataloging area but regarded OCLC as a source of additional information. The precedent of the main library's adoption of

OCLC no doubt helped, but the law school tends to get what it requests since it is the university's top moneymaker. Once the need for OCLC was pointed out to the law school administration, it was a matter of "prestige" that the law library should have it since the main library did.

The library in Case 1 saw a very different innovation than did the other sites and had no choice in its adoption decision - RLIN had not yet been developed. The same is true to a lesser extent for Cases 28 and 49, and also Case 10, which joined OCLC at about the time RLIN was getting underway. By the time the site decided to install its own terminal, RLIN was in existence but there was no decision to change utilities. The two later adopting sites technically had a choice between OCLC and RLIN, but OCLC's more established status was a significant factor for one, and the other site may not have considered any bibliographic utility other than OCLC.

The early adopter libraries (Cases 40 and 52) were aware of RLIN prior to its actual establishment, mainly because of personal connections to the University of Stanford. The adoption process at Case 60 is interesting because it represents a different adoption of bibliographic utility on the part of a branch library from its main library counterpart which had adopted OCLC. Proximity, personal contacts and system features were major factors in the decision process. The fact that the library already subscribed to DIALOG, an online search service, paved the way for adoption of RLIN.

Case 16 presents a rather different adoption process. The library's parent institution had already made a substantial investment in the development of an in-house library system. The decision to adopt RLIN was made at a higher level within the organization and without consulting the librarian. Furthermore, originally RLIN committed to a joint system development project but the arrangement did not work. After much argument and uncertainty on the part of the library staff as to what was happening, there was a change in institutional personnel (not in the library) and RLIN use proceeded. However, library staff feel quite strongly that OCLC would be a better choice for them.

Case 31 presents yet another adoption pattern. This library was a late adopter of RLIN (1982/83). The main reason for delaying the adoption process was that a bibliographic utility was not seen as being directly relevant to the library's needs. The library, a city library, had all its processing handled by the county library processing center. It was only when the service from the center dropped to an unacceptable level that the library moved to adopt a utility.

Two major factors influenced this library's decision to adopt a utility, and to adopt RLIN. The first was that the State Library offered start-up grants to libraries for joining bibliographic utilities. The second was that a local library cooperative had recently acquired RLIN and heavily promoted its use. The library in Case 31 partially adopted RLIN through search-only access in 1982 and in early 1983 became a full cataloging member.

The early adopter/developer of WLN was aware of WLN from the initial conversations among public libraries regarding sharing of resources instigated by the state librarian in 1968 or 1969. The leadership of the library always assumed that they would be a part of WLN. The library had already converted its holdings to machine-readable form through a contract with Xerox Corporation, so that the library had to reprogram records to be compatible with WLN. Since this was the time of the development of the WLN database, the participation of Case 19 helped underwrite the WLN development. Like other early sites, this site had no significant barriers or problem areas. They were ready to take on WLN.

Case 22 represented the combination of a library with very large holdings and huge backlogs in cataloging. In the mid-1970s, a new director was hired who, in turn, brought in a new head of cataloging with prior involvement in computerization. These new staff members felt that the problems could be solved by automated cataloging. WLN to this point had consisted of relatively small libraries and the addition of this library would greatly enhance the database and without doubt encourage many other libraries to join WLN. In fact, about 20 members of WLN wrote a letter to the State Librarian urging that the library in Case 22 be induced to join and proposed giving all the LSCA funds for the following year to input that library's records. With a combination of LSCA funds and the library's own endowment monies, conversion began. The library began cataloging via WLN in May 1980; the conversion project — done by WLN — took 2.5 years.

Case 25's librarian has always been aware of WLN even though she was a non-member but the question of cost delayed adoption until she attended a meeting where WLN dial-up services were demonstrated. She realized that her holdings could be entered into the WLN database at minimal cost through a plan whereby she would use WLBR (a WLN function which allowed entries of items one year old or older if the purpose was to produce a microfiche catalog in conjunction with another WLN member library). The county library with which Case 25 had a cooperative agreement was a WLN member. Case 25 obtained use of a terminal, hired a college student for data entry, and began the conversion process at the very low charge of 11 cents per record. WLN staff were helpful to the librarian although they had second thoughts about the WLBR plan since it was seen as a threat to their overall cost recovery policy. Case 25 was allowed to continue inputting records but other non-WLN members no longer were given this option. The conversion began in the fall of 1981; by the summer of 1984, some 104,000 of the library's 120,000 entries were entered.

Full WLN participation had been planned by the librarian but the cost of a WLN membership increased to almost twice the amount of money she had budgeted for; negotiations brought the price almost within reach, but unsure about future costs, the librarian was reluctant to commit her library.

The trio of WLN adoptions show the same pattern of early awareness as do the other bibliographic utility adoption sites. Because they systematically monitor developments in the field, librarians in all the libraries visited heard about the innovations as soon as they were available, but then diverged in the length of time until actual adoption. Our sample of course is a sample of innovators, but librarians as a professional group appear to be very active in monitoring the field through formal and informal ties among librarians at different levels and also through the professional literature.

No doubt there are libraries in the United States untouched by any of these innovations due to the philosophy, resistance, and/or fear of their leadership; but the leadership of American libraries is continuously replacing itself. Before very long, all libraries will be touched by professionals who have either learned about technology in their MLS work or have had experience with it in their positions at other libraries. Moreover, the push from patrons and governments will exert influence or all tyes of libraries.

3. Adaptations

In the eight institutions adopting OCLC one can clearly see the life cycle of innovation implementation. The library in Case 1, having been drawn to OCLC by the collaborative nature of the arrangement, now finds OCLC not as user-friendly and is considering a shift to a more localized system and network where it will have more control. Case 4, although a much later adopter than Case 1, echoes the concerns of this site. Case 4 has moved swiftly through implementation stages and is now a routine user of OCLC. The head cataloger, however, is an experienced OCLC veteran -- this is his third OCLC implementation -- and his concerns center less on operating the innovation per se than on participation and ownership, etc. Case 10 brought OCLC in-house at the same time as Case 4 but the head cataloger position was not filled until later. The decision and adoption process of Case 10 did not appear to be focused on organizational problems but more on what it could do with the innovation within the parameters currently operating.

In Case 7, where OCLC participation had begun only a few months before our visit, they were concentrating on the nuts-and-bolts of operating the system, figuring out installation and learning by trial-and-error.

Libraries incorporate those components of an innovation that they feel they need. No library in our sample used all the elements of OCLC; many however, had acquired additional functions and planned to add still others.

If bibliographic utilities thought they might achieve "vertical integration" through consolidation of services, this has not been the perception of the libraries in our sample. The libraries have treated the offerings of OCLC as a menu from which to choose. Those that have had more experience with technologies have balked at dedicated terminals and similar constraints, preferring the flexibility of multi-purpose equipment.

Similarly, libraries have been good at finding additional uses for OCLC. Over the years it has moved from a cataloging device to a database for reference applications. In fact, at least one of our libraries had become "a member of RLIN and had purchased passwords for several departments", anticipating widespread use. Not only has the innovation grown and developed, libraries' needs and perceptions have changed too. However, like couples that grow apart if one or both change too substantially, the development of both libraries and OCLC over time has produced some mismatches. For example, the library in Case 1 no longer considers OCLC an appropriate organization for its particular needs. It would prefer a return to a non-localized, friendly system.

The only RLIN adaptation observed was the expansion to include the acquisitions module by Case 40.

The three WLN sites have not made any major changes in the innovation. The early adopting site "negotiated some things and got them changed", e.g., a provision which would allow individual library COMCATs. The middle adopter has added the acquisitions component. In WLBR, the partial late, partial adopter uses what is essentially an adaptation that makes partial use of some WLN features.

Looking across the cases, one sees the early libraries negotiating changes as the development of the innovation proceeds, making the innovation-library fit a better one. Middle adopters take advantage of componentability of the innovations to take on basic functions, then add others as appropriate or as they become available. Late adopting sites not only have a menu of components to choose from, but may be able to take advantage of any user-oriented developments that have arisen, such as software or new components to fit special markets.

4/5. Barriers and Facilitators

The barriers appear to differ by time of adoption. The early adopting sites cited factors concerning the stage of the innovation's development as inhibitors, including such items as lack of instructions, poor manuals, and/or the undeveloped status of technology. In contrast, the barriers of the middle adopters had to do with attitudes and/or characteristics of their own or their parent organizations. These attitudes were eventually overcome but they delayed swift implementation. Late-adopting libraries could cite no barriers; one can imagine late adopters having few barriers except perhaps lack of need, or else so many needs that implementation is delayed indefinitely.

In a like manner, facilitators vary with innovation characteristics, e.g., the networking approach and collaborative approach of OCLC mentioned by the very early adopter. Proximity of the libraries to the original developing institutions was also an important facilitator. As we shall see in the cases of other sites adopting innovations, early adopters who sought out innovations appeared to have few if any organization barriers as well.

At least one of the eight sites adopted OCLC in part to solve a pressing problem: a backlog of thousands of uncataloged books. This was a middle adopting site that had many organizational barriers to overcome. As we shall see, significiant problems did not come up at all in early adopting sites perhaps because the early phases of an innovation present as many problems as are solved. Thus, early adopters, particularly those who actively participate in the development process expect problems to arise. Moreover, sites that mentioned problems did not view themselves as innovators but rather as institutions that could not afford to make mistakes.

Barriers and facilitators did shift by stage of implementation, although, as is discussed later in this section. The same factor could be positive in one stage and negative in another. For example, in Case 4, a significant change of library leadership had a facilitating effect on the progress toward OCLC adoption. Had this occurred at another time, it might have derailed the effort.

In this same case, the absence due to illness of the head cataloger - who was against a utility - was positive in the sense that it allowed an automation committee to move ahead: her negative attitude had stopped consideration of a bibliographic utility some years before.

The barriers experienced by RLIN adopters related both to the status of RLIN at the time of adoption and to the particular circumstances of each library at that time. In review of barriers relating to RLIN itself, one library resented having to acquire dedicated terminals (Case 40), another (Case 16) cited the lack of a user group, poor documentation, inadequate training, and the fact that RLIN was still under development. The library in Case 31 also cited organizational problems with RLIN and CLASS, and equipment problems.

Facilitators for the RLIN adopters included leadership commitment on the part of the library directors and heads of cataloging in Cases 16 and 40 and also at higher institutional levels in Case 16. Also in Case 16 the costs of implementation and operation were absorbed by the institution, and experience with the earlier in-house systems development project helped facilitate adoption of RLIN. In Case 31 circumstances were somewhat different and the inadequacy of a prior service was a prime contributing factor. Also, important facilitators were the library's participation in a local network and local libraries' choice of RLIN for state funding for start-up and the availability of search-only access to the database which provided a gradual step-by-step adaptor process.

For the early WLN site, there were no barriers evident. The middle adopter cited the chaotic state of cataloging in the library, the high cost of inputting a very large set of records into the WLN system, and suspicion/fear of computer technology by some staff. The partial adopter, continues to find the cost of WLN membership prohibitive. These last two sites experienced barriers that were largely institution-based, having little or nothing to do with the innovation itself, although one could claim that cost is an innovation characteristic.

For the early WLN adopter, several facilitators helped tremendously. The library had a strong financial base, allowing it to participate in what was then an experiment, an untested innovation. Acquisitions for this multi-member library system are centralized, making the demand for shared cataloging very strong. The library already had experience with another vendor in creating a machine-readable catalog. WLN is a local utility, so that proximity, coupled with Case 19's early participation, made it possible for WLN to adapt its system to meet that library's individual needs.

The middle adopter of WLN had a need to do something about its backlog of cataloging. New library leadership was entrepreneurial, had extensive experience with technology including the development of bibliographic utilities in general and WLN in particular, and participated in other organizations and networks which were concerned with these issues. Because of the size, reputation, and centrality of the library, other libraries and WLN were eager to bring it into WLN. Between these facilitating actions from these other libraries and the skill of the leadership, Case 22 received funds both from its own endowment and from the state library (LSCA) to make joining WLN possible. The high quality of the WLN database and the improvements in the utility over the time of the decision process only served to make membership more attractive for this library.

Although it has not adopted fully, the fact that Case 25 participates at all in WLN activities is due on the one hand to the resourcefulness and network involvement of the librarian and, on the other hand, to the willingness of WLN to make special arrangements so that the library could at least get started on the road to WLN membership.

6/7. Level of Use and Operational Profile Scale

The level of use scale ranges from 0 to 11. At the low end is a lack of awareness of the innovation and a lack of understanding of the implications of use of the innovations. At the top of the scale is more-or-less continuous use. The adopters of bibliographic utilities scored an overall average of 9.6 points on this scale. However, some differences occur when considering the different implementations of bibliographic utility:

- OCLC 10.6
- RLIN 9.0
- WLN 8.3

The operational profile scale varied for each innovation type because of the variety of features that could potentially be implemented. This scale can be used as an indicator of extent of use. The overall operational profile for bibliographic adopters was 52 percent. This breaks down in a very consistent way by system/service implemented as follows:

- OCLC 52%
- RLIN 54%
- WLN 50%

8. Benefits

All the libraries adopting OCLC mentioned the direct benefits of improved cataloging: new material reaching the shelves more quickly, improved standards, more consistency, etc. In addition, they described other benefits associated with OCLC as a database: resource-sharing through interlibrary loan; improved reference services; an increase in interlibrary loan activity as users discover what's out there; improved bibliographic knowledge. Only one library in this group mentioned movement towards an online catalog. A couple of libraries talked about the benefits for staff including being "more aware of doing a good job"; "having our own terminal made us feel grownup; more independent - bringing in a technological innovation can do a lot to boost staff morale and increase their interest in work. It makes them feel they're worth something." This respondent also remarked that adoption of a bibliographic utility socialized people to the computer and brought them together from different departments. The cataloger in the late-adopting site had clearly resisted the challenge of using a computer; initially afraid, he had grown "to love the terminal". Another librarian talked about the extensive contact with others in the same type of library she had through the users' group.

Case 19 listed the direct benefits accruing from the use of WLN: speed, faster cataloging, faster interlibrary loan and faster item identification and retrieval. Case 22 noted that, for the library, the use of standards has been a great benefit; for patrons, there can be a complete catalog in every branch and the library can do more for less money. For the partial adopting library, Case 25, the benefits of a machine-readable database have not yet been very visible; however, the library is awaiting the implementation of a new circulation system which will build upon the database.

9. Costs

Two informants said there were no costs other than "bothered eyes". One library did not indicate actual costs but noted that OCLC was expensive. Another noted the expense of belonging to the OCLC network, cited terminal fatigue and some fear. He also mentioned that there was a cost to users because the catalog cards were not as easy to read as before.

There were or will be social costs felt at each library. At the early adopting libraries, some personnel quit as a result of adoption, apparently resisting terminal use and fearing health problems. Respondents also clearly felt the social costs of dealing with technology, noting that automation can only be introduced on piece at a time. At other libraries, it appears that technical services librarians will have to spend time at the reference desk, a role change which some view with apprehension, and some as a challenge and opportunity.

As far as opportunity costs are concerned, one site articulated the general sentiment that money would have had to be spent on cataloging no matter which system was used or what solution was chosen. The libraries were able to make progress they did without hurting the other library functions or operations.

In terms of financial costs, one library commented, "It probably has not saved us money." A partial adopter has been able to achieve its current progress to date with minimal costs because of equipment borrowing, use of low-cost access system features, and high production/low waged personnel.

10. Benefit-to-Cost Ratio

The respondents were asked to indicate the benefit-to-cost ratio (on a five-point scale, with 1 representing costs clearly outweighing benefits and 5 representing benefits very far outweighing costs) for two distinct time periods. First, they were asked to weigh benefits against costs from the time of adoption to the present. Then they were asked to indicate their expectations of benefits relative to costs for the next five years. Overall, the adopters of bibliographic utilities considered the benefits clearly had outweighed costs up to the present time with an average score of 4.0, and that they would remain more or less at the same level in the future with a score of 3.9.

The adopters of RLIN were the only group that expected the benefit-to-cost relationship to improve over the next five years from a score of 4.0 to 4.4. The adopters of OCLC and WLN felt that the benefit-to-cost ratio would decrease from 4.3 to 3.9 in the case of OCLC adopters, and from 3.5 to 3.0 in the case of WLN adopters.

11. Continuation

The process of innovation adoption continues well beyond the initial implementation process. In fact, we tend to consider that true adoption has occurred only when the innovation is incorporated into the daily routine operation of the library. These are several indicators of such continuation or routinization. These range from an organizational commitment to continued use of innovation as evidenced by alterations in the annual operating budgets, descriptive and publicity materials that describe/announce the innovation, redefinition of roles and duties of library staff to reflect use of the innovation, alterations or reallocations of library facilities to support the innovations (if appropriate), and whether hiring practices have been altered to reflect the fact that certain knowledge, skills and attitudes are required for working with the innovation.

Using a scale of 0 - 7 or 0 - 100 percent to indicate the level of commitment to continued use of the innovation, the following overall scores were derived:

Average for all bibliographic utilities	5.3 or 76%
Average for OCLC	5.9 or 84%
Average for RLIN	5.2 or 74%
Average for WLN	4.3 or 61%

12. Secondary Diffusion

The early adopting OCLC library mentioned a couple of instances of diffusion, one on its own campus and the other in a nearby college. Being located on the same campus, Cases 4 and 7 clearly have influenced each other but much less than one might have expected. The cataloger at Case 7 also mentioned that he was attempting to convert his coworker who does the billing to use of the terminal.

Secondary diffusion activities have been somewhat limited in two of the libraries (Cases 31 and 40) to presentations at local meetings and demonstrating the system to visiting librarians (usually from the local area/region). There has been no secondary diffusion from Case 16 mainly because the library staff do not feel that RLIN is the appropriate choice for biomedical libraries.

The early adopters of WLN gets many visitors to see how WLN works for them. Some of these are sent by the State Library. Our informants have also spoken favorably about WLN at ALA where they emphasized that it is the most public library-oriented of the bibliographic utilities. Large libraries have engaged in considerable internal diffusion to library staff members.

5.3.2 Adoption of Online Searching

A total of 17 case studies on adoption of online searching were generated from the site visits. Of these, 5 involved academic libraries, 7 public libraries and 5 special libraries. The case studies focussed on adoption of DIALOG, Medline and BRS.

1. Cross-Site Adoption Pattern

The seven public libraries which adopted DIALOG as their first online system, represent a very wide range of adoption responses to online searching. Two libraries (Cases 29 and 32) were 1973 adopters under a special NSF-supported "DIALIB" project, but one dropped the service after 18 months when high staff costs became apparent. The third adoption came in 1977 at a large city library. The fourth was a large metropolitan county system in the same area adopting in 1981, partly under the influence of the third. A fifth adopter in 1983 was another large suburban county system. The same year the earlier lapsed case (Case 32) resumed service on a very limited scale. The sixth and seventh adopters are smaller city libraries, one now poised to adopt in 1985 (Case 26) and the other not seriously considering it (Case 35).

Looking across the seven there is no obvious pattern except nearly all are weak adopters, i.e., they run only a few searches with part time use of staff and terminals, usually without advertising. Earlier adopters can point to periods of heavier public promotion which either had disappointing results or attracted a clientele (e.g., university students) which the public libraries were not set up to serve.

The two earliest adopters were clearly influenced by proximity to the developer and a heavy subsidy to start-up operations. There was almost no spread of effect from these early adopters and it appears that a widespread social interaction effort promoting online seaching among public libraries did not occur until the late 1970s. The 1977 adoption can actually be traced to a librarian with prior experience of online searching at a university library.

Three libraries were studied which had adopted Medline, an online service established in 1971 by the National Library of Medicine to search the world literature of referred biomedical journals. The three libraries are all university biomedical libraries serving medical schools and health science departments of three large and prestigious universities; two private and one public.

All three libraries could be described as early adopters of online searching, with one adopting as an initial pilot site (1971), a second within a year of availability of the service (1972), and the third within four years of availability (1975). Nevertheless, in the context of this particular innovation the three sites could be described as "very early", "early-middle" and "middle-late" because the innovation was developed for this specific category of library as was advertised, represented the culmination of an expensive, federally-supported development process, filled a clear and pressing need for a certain category of users (medical researchers) and was initially offered as a free service. As a result, according to NLM, nearly 100 percent adoption by established biomedical and health science libraries was achieved by 1975. In fact the 1975 site was selected after consultation with NLM and searching of their records to identify the last cohort of trainees. The 1972 adopter estimated that they were in the third cohort of trainees and it is clear that the 1971 adopter was in the first cohort.

The pattern of adoption overall of Medline was clearly rapid, once the technology was in place. There was no early extended "innovator" phase where a few adopters were struggling to make the technology work at great cost, nor was there a long "laggard" phase in which isolated, less well-informed and anti-innovative sites held out. In fact, the adoption process was controlled by the developer, NLM, which provided only so many training slots per year through 1975 when the database became much more widely available through BRS.

The five special libraries and two academic libraries adopting BRS in this sample represent three technology and science-related corporations, the central library of a large mainly medical service-related federal agency, and an art museum. Despite obvious differences in size and mission they have many commonalities as online searching adopters and are also comparable in many ways to the previously discussed academic medical libraries. Two could be rated as very early online searching adopters (Case 50, the federal library, and Case 53, a high tech firm, 1971) and a third could be rated on fairly early (Case 41, another high tech firm in 1973).

One library (Case 47), a diversified research consulting firm, adopted fairly late for a special library, 1978. The art museum library (Case 44) is still not an adopter, but its librarian says, "We desperately want it," and adoption seems likely in the near future.

2. Adoption Process Stages

The stage model of adoption fits all cases reasonably well. There are discrete stages of awareness which precede serious interest at most libraries and a stage of serious interest which precedes an adoption decision at libraries which have adopted.

It is most noteworthy that the two early adopters of DIALOG differ from later adopters in stage pattern. Since they were approached very early by a developer with a no-cost proposition involving little apparent risk, an adoption decision followed awareness and serious interest very rapidly. Implementation at both sites proved more costly and complicated than anticipated and at one library (Case 32) led to discontinuance after 18 months. At the early/middle adopting library (Case 23, 1977), there had been an extended awareness period among some staff, but no serious interest until a new staff person came from a university in a different part of the country and pushed for rapid adoption.

The two later adoptors of DIALOG could be characterized as having long awareness and long serious interest phases which preceded adoption decisions. Their decision-making processes around the innovation are far more complex, involving deliberations about the role of the library, the ethics of charging for services, pressure from internal innovators, pressure from, or awareness of, other libraries' prior adoption, and concerns regarding budgets. The non-adopters also expressed some of these concerns but both see other priorities as clearly coming ahead of online searching, partly out of as sense that their own user communities have no real need, both being smaller city libraries with largely working class user populations.

Outsiders were clearly involved in encouraging serious interest and pushing for adoption at the two earliest adopters of DIALOG where the developer organized a small regional consortium of public libraries to try out his system. At one of the libraries (Case 29) transfer was aided by the fact that the city had a "technology agent" who knew the developer and was strongly supportive of his city library's inclusion in the project.

Lack of strong support from the city librarian was probably a major factor in discontinuance at the other early DIALOG adopting site (Case 32).

At the early/middle adopter of DIALOG (Case 23) the city librarian was supportive from the time the proposal was first put to him to the present, but initiative came from a new senior staff person who came from a university library in another region. From her arrival to implementation the time was less than a year (the pattern is similar to the late adopter of Medline (Case 14), although in this case online searching was not set as a precondition of employment).

Case 38, the later adopter of DIALOG, a metropolitan county library, contrasts in an interesting way to Case 23 in that here the innovator pressed the library administrator for adoption over an extended period before there was a favorable decision. At the other metropolitan library (Case 20) there was also an internal innovator who encountered some administrative opposition, but in this case, she was aided by the fact that nearby libraries had already adopted and were creating the impression of a bandwagon.

In Case 32 there also was an internal innovator who pressed for readoption against administrative resistance. The breakthrough came finally with support from an assistant head librarian and city officials.

There does seem to be a clear pattern across several middle adopting sites of an innovative reference librarian, usually with hands-on online searching experience from somewhere else and well connected to a social network of like-minded reference librarians, pressing for adoption over a period of time. This person who could be described as the internal innovation champion is clearly responsible for making the library seriously interested in the change and usually is the one responsible for implementation after a positive decision has been made.

However, the innovation champion does not seem to control the decision itself, nor the speed with which a library will reach that decision. The adoption decision seems to reside most obviously with the chief librarian or library administrator. In the case where this person was clearly supportive, implementation began within a few months of the initial proposal by the champion. Where administrators are reluctant, we can expect delays in adoption of one or more years.

It could be said from this set of cases that the perception of barriers increases as the operating characteristics of an innovation became better known and more widely known, up to and perhaps beyond the time that the innovation is remodeled to reduce those barriers. To the earliest adopting public libraries, online searching was a completely new and unknown phenomenon. There were no barriers for two reasons: (1) they were not aware of what the problems would be from the experience of others (there were no others, or at least no other public library "others"), and (2) the developer provided an initial 100 percent subsidy including training, equipment, and telecommunications line charges. So they gained experience. After adoption they learned that the cost in staff time would be considerable and also learned that the service would bring them a new clientele, students, which they were not sure they wanted to serve. It seems likely that neither site would have adopted without these two special conditions.

Over time the online searching developers have improved systems in many ways, providing more databases, faster equipment, more responsive software and in some cases lower charges. These changes, which can be expected for any complex innovations such as online searching, bibliographic utilities, and output performance measures, provide built-in incentives for later adoption, particularly by smaller, less affluent systems which do not have compelling needs for the innovations.

The financial costs of online searching, whether real or perceived, are clearly a significant inhibiting factor at the point of adoption decision, especially for later adopters, and are the chief prohibitive factor for non-adopters.

Of the seven public libraries in our sample, two represent large cities and one of these was a very early adopter and the other an early/middle adopter. Three represent small cities and of these two are still non-adopters and the third, a very early adopter thanks largely to proximity to the developer and other very early adopter sites, was a discontinuer who readopted very late (1983) on a very limited basis (ready reference, library staff only). The other two, large county systems with many small branches, adopted fairly late. Thus, it would appear that there is a strong relationship between time of adoption and gross library/community characteristics.

The three cases of Medline adoption represent somewhat different adoption patterns. The earliest adopter (Case 11) came to the service through the network connections of a subordinate librarian working in the university hospital, away from the main medical library. She was known to NLM developers and was asked to be a participant in the pilot test. She was therefore one of the initial trainees. Since NLM supported all costs including the terminal for the pilot test, the university medical school had no objection and a 2-3 page letter of agreement constituted formal adoption.

By fairly rapid steps, online searching at this earliest adopter moved from being a peripheral low cost item to a central high visibility feature of the library with purchased and reguarly upgraded equipment and three trained searchers. When the initial adopting librarian left in 1983, she made sure that her replacement was trained first, and by May 1983 when a new library facility was opened, online searching was featured on opening day.

At the second adopting site (Case 17), both the librarian and the first trainee were aware of the potential of online searching and were following reports of NLM development work in the late 1960s. They also participated in NLM's predecessor system, the batch-mode TWX service, which allowed searches through designated regional centers. For Case 17, the nearest center was 200 miles distance and the process was found to be cumbersome. In spite of this fairly negative experience or perhaps because of it, they were eager to adopt when it became available. However, they were required to purchase their own equipment and pay for the training and were not able to use regular university library funds for this purpose. Through good network connections, they managed to get a small grant from a medical supplier to purchase equipment and funds from the federally supported Regional Medical Program for training. After initial training they developed a very intensive publicity campaign which brought in 3,000 requests during the first year of operation. There were no charges that first year (1972-73) as there were no use charges from NLM.

Case 14, the last adopter of Medline in our sample came to the service through change of leadership in the medical library. The director up to 1975 was a historian with no experience of or interest in library technology. Thus, no moves were made toward acquiring online searching capability prior to 1975. The incoming director had been a staff member at a major east coast medical library which had been an early adopter. When she was interviewed for the new position, she was distressed at the lack of online searching capability and the general condition of the library. She stipulated acquisition of online searching as a condition of her employment. Since assuming her post in April 1975, she has taken on the task of general revamping and upgrading of the library with the enthusiastic support of dean and faculty. Start-up was very abrupt: "I came in February; it was up and running in April," made possible in part by nearly total budgetary freedom thanks to a large bequest which would be used at the discretion of the supportive dean.

All three libraries, therefore, show rapid and fairly uncomplicated adoption patterns. Awareness came with first availability of the technology and sometimes even before. Interest was simultaneous with awareness and led immediately to a search for resources so that the technology could be acquired. In only one library (Case 17, the early-middle adopter) can there be said to have been any scramble for resources.

All three libraries suggest that online searching was received with ambivalence by upper levels of management. In Case 11 the director in 1971 was reportedly afraid of computers and so took no initiative. Therefore, without the original willingness of the staff librarian and the fact that NLM was making what amounted to be a substantial gift adoption would certainly have occurred much later. The proximity of the library to NLM was probably the key factor in adoption. A subsequent library director in the mid-1970s was much more supportive and endorsed crucial equipment purchase decisions when the pilot project was terminated. In Case 17, the biomedical library adopted without any support from top library management at the university level. This forced them to go outside for financing. University indifference to online searching has persisted at that library despite the very strong installation and very high use levels within the biomedical library. In Case 14 there was likewise no support from the university library system, but policy control and budgetary control for the medical school library resided with the medical school dean. It took a change of deans and then a change of librarians to bring about adoption.

Informants at all special and academic adopter libraries reported awareness in the very early 1970s or earlier. Almost all had serious interest nearly from the moment of awareness because of a perception that their patrons would not be hesitant at using new technology and would find it immediately job-relevant and useful. At the art museum library interest lagged because appropriate/relevant databases were not online and have come on-line only since the middle 1980s.

Adoption decisions at the earliest adopting sites came nearly as soon as the innovation was available from the developer for adoption. In all cases, proximity to the developer was an important factor as was familiarity with the developer and direct personal contact with the developer. An operational subsidy was also provided at the government site, this being one of the early pilot sites for Medline.

At the fairly early adopting library (Case 41) the head librarian was not favorably disposed but the champion was able to elicit support and the grant of a terminal from senior staff scientists. At the later adopting research firm (Case 47) an adoption decision was held up by resistance, indifference, or fear of technology by the chief librarian. At the non-adopting art museum library, a decision has been held up for a period of years primarily because of the doubts of the head librarian regarding the readiness of the technology (lack of appropriate databases) rather than any technology fears, other library computer technologies already being in place at this site.

Implementation of all adopting sites was aided by the clear perception of tangible benefit by first users.

3. Adaptations

Public libraries in our sample generally did not treat online searching as a major innovation and did not install a use configuration which encouraged significant access by library partrons. Even at very early adopter libraries (e.g., Cases 29 and 32) where direct patron access was initially encouraged, online searching is now seen as a central office function for use primarily as an aid to reference librarians, usually for ready reference purposes. This is also the pattern at later adopting sites. At only two libraries, Cases 20 and 23, do we find a central library enouraging direct patron access to online searching through a trained reference librarian. None of the libraries allow direct terminal access to patrons. In fact, the strongest example of online searching use in our public library sample is Case 23 where the branch is, in reality, a special library serving city government officals and located in the city government building.

It is also interesting to note that DIALOG is almost the exclusive vendor to all these public libraries, and in the two or three cases when other vendors were adopted at one time or another, service through these vendors has either diminished or been terminated. It should be noted, of course, that three of these sites were selected precisely because they were known to be DIALOG users.

Adaptations are generally not unique to sites or to public library characteristics except that very large libraries can choose either to create online searching specialists on their reference staff (as is the case in Case 29) or they can disperse the access function reference department and staff (as in Case 23). Two other unique adaptations should be noted. Case 29 has come to be seen in its area as a center for online searching to which other small and medium sized libraries can send search requests. It may have this function as a residual effect of being a very active member of the original public library consortium. As other libraries in the area have found it too costly to maintain their own online searching function they have turned to Case 29. In spite of this emerging wheel-spoke pattern, the volume of requests remains low (1-2 per week).

The other significant adaptation is the very vigorous outreaching online searching at the city hall branch (Case 23) previously mentioned.

Later adopters find it easier to accept online searching when it is configured as an enhancement of an existing function rather than as something altogether different from what they have done before. Hence the ready reference function of online searching is popular with later adopters. It is also seen as more acceptable to later adopters if it can be performed on equipment which serves other purposes, e.g., bibliographic utility terminals.

Although most of the uses by public libraries can be described as "worthy" and "enhancing", they do not take full advantage of the potential of online searching as a service and as a new way to look at the relationship between the library and its public. The contrast between potential and actual is clear when we compare public library online searching use among these seven cases and the pattern and intensity of use of Medline and other online searching services by the three biomedical libraries studied. Even within this set of cases, however, we find the same contrast when we compare the Case 23 city government library online searching user and all other others. The head of this branch is so convinced of the power of online searching that she would sacrific her entire acquisitions budget to maintain it if she had to. For almost all others it is a relatively inconsequential add-on which would have to be sacrificed in a budget squeeze.

Online searching does not appear to have been an innovation that was easily adoptable by public libraries in its original configuration unless the developer or someone else fully subsidized the whole operation. Even then it was too big a thing, too disruptive of traditional library ways and not providing enough new user demand or intrinsic satisfaction to be sustainable at a high level. Later configurations of online searching as a part of general reference and not an advertised public service apparently represent the adaptation that was viable for public libraries up through the mid 1980s.

For most public libraries to date there appears to have been more adaptation of the innovation than of the adopting institutions.

The two earlier adopting academic libraries, Cases 11 and 17, have had to modify their charging policies over the years. Case 11, which began with heavy NLM subsidy as a pilot site, resisted charging users of Medline until July 1984, although it did charge for other online searching services as they became available. On the other hand, in Case 17 there continued to be no budgetary support from the university, a $5 charge was instituted the second year, resulting in a decline of user requests from 3,000 to 1,700. However, the next year the count was back over 3,000 in spite of charges and has grown steadily since to the current level of 5,000, making it the most used service among all libraries studied in this project. Late starting library, Case 14, started charging from the outset and has not changed that policy. All three sites now have similar charging policies, a basic minimum search costing users about $5.00. This allows all three to recover most of their direct vendor and line costs. Connect costs at Case 11 have risen from $2,000 in the first year of NLM charging to $20,000 in 1983. At Case 17, the highest user, direct costs now run at $40,000, all offset by user fees.

All three sites have also upgraded their equipment, moving to higher speed terminals as these have become available. Comparing earlier and later adoptions it appears that earlier adopters had to make more and more costly adjustments. Case 11 began in 1971 with a 120 baud terminal given by NLM but 2 years later acquired its own 300 baud terminal. In 1972 Case 17 began with a 300 baud terminal as did case 14 in 1975. All now have at least 2 terminals, one of which is a 1200 baud. All have gone beyond Medline to access other data bases through DIALOG and BRS. Case 17 now acquires 75 percent of searches including Medline through BRS. Case 14 does 55 percent of searches through BRS, while Case 11 uses BRS only 80 percent of the time, down from 30 percent 2 years ago.

In comparing the three sites the most interesting differences are in policy regarding user access. During the pilot test in Case 11, the librarian actually trained users to do their own searching, but this policy lapsed with the move to new facilities and the training of more librarians as searchers. User direct access has never been instituted at the other two libraries but Case 17 has begun offering courses in online searching for students and faculty with home computers. Case 11 has also started orientation seminars for students on home computer options and services.

4. Barriers

In at least four cases resistance to the innovation could be seen as a function of what the innovation was and what benefits it promised. Four libraries (Cases 20, 26, 35 and 38) clearly understood what it had to offer and deliberately chose, at least for a time, to reject it in favor of other priorities.

Financial costs and intrinsic characteristics are more serious for smaller public libraries and together account for non-adoption at two sites and discontinuance at a third.

Fiscal issues play a role at all sites and are significant inhibitors of either adoption, continence or maintenance at a high level at six of the seven public libraries.

Attitudes of librarians played a subtle role at a few sites. Skeptical senior library administrators undoubtedly slowed down innovation adoption in Case 38 and led to discontinuance in Case 32. Anti-technology or technology fright were also evident in Case 23 but did not slow down adoption in any perceptible way.

None of the libraries or librarians among the set of public libraries could really be described as either geographically or professionally isolated. All were reasonably aware of and even knowledgeable about online searching at a fairly early date.

We found few barriers to adoption at any of the special and academic libraries. At all sites there were decision makers at fairly high levels who were indifferent to or negative to online searching. In Case 11, they made no difference initially because NLM provided all additional resources and absorbed all costs. It Case 17 the resourcefulness and strong motivation of the adopting librarian and her immediate boss brought in resources that the university library leadership were unwilling to give. At the lagging library, Case 14, the resisting librarian was replaced by a reformer who insisted on it.

The innovation configuration of Medline in 1971 appears to have been eminently adoptable, especially with NLM underwriting search and line costs.

It is noteworthy that all academic and special libraries charge for services although Cases 11 and 17 did not charge initially. Nevertheless, charging for online searching per se does not seem to have inhibited long term use at any of these three sites.

The attitudes of librarians played an important role in the adoption process. Many senior librarians in positions of power were indifferent or ignorant of online searching. Younger, more technically oriented librarians were more positive and in two cases replaced resisters.

Physical remoteness was possibly a factor for Case 17 in initially being unenthusiastic about the predecessor, the TWX batch mode service at NLM. When they realized that they would gain direct online access to the NLM data base 1,000 miles away without going through an intermediate regional center and without relying on slow and cumbersome mail communication, they quickly sought and found ways to come on board.

A major factor in Case 14's late adoption was lack of connectivity to developers and early adopters. With the older historically-oriented directors, the library was essentially isolated from new developments in the field.

5. Facilitators

The most striking feature of the adoption process at all the libraries was the role played by different individuals. There are three distinct types of roles: the inside innovation champion (referred to previously); the external promoter; and the supportive authority. We observed strong innovation champions in at least five public libraries (Cases 20, 23, 26, 32, and 38). We also noted supportive authorities at five public libraries (Cases 20, 23, 29, 32, and 35). In one case, this was a library board member who was a respected executive of an aircraft company and a strong advocate of library technology. In another case it was a special city official known as a "technology agent" and in the other cases it was the chief librarian or administrator of the library system. Typically these supportive authorities would not initiate change but would give strong vocal support when the change was proposed to them by the champion.

There was an important role played by external promoters in four public libraries. In two of these the developer-vendor recruited a small consortium of five public libraries of which they were members. Clearly, if they had not been approached by the developer, they would not have adopted online searching for years more. In Case 20, a former staff member pressed the library to allow him to demonstrate online searching to its various branches. Although he was not successful in his initial proposal, his promotional effort helped put online searching on the agenda.

In Case 26, although online searching has not yet been adopted it has been promoted actively by a vendor representative and is expected to be adopted soon, partly because of this input.

The availability of a large library endowment fund in Case 23 undoubtedly made adoption easy and rapid once a proposal had been made and approved by the city librarian. The offer of a 100 percent initial subsidy to be followed by successively weaker susbsidies over a five year break-in period undoubtedly paved the way for initial adoption in Cases 29 and 32 but was not sufficient to keep online searching going in Case 32 beyond 18 months.

Key reference staff at nearly all sites were well-informed and favorable to online searching from an early stage.

Geographic proximity played an important role in at least three libraries. Cases 29 and 32 were geographically close to one another and to the developer. Case 20 was located only a few city blocks from Case 23 although their territorial coverage was non-overlapping. They noted that they were partly influenced by the earlier adoption of online searching at Case 23.

Network connections are clearly important in at least three ways among these public libraries. The strong networking among innovative reference librarians has given them a means of sharing and reflecting on their experience and weighing the pros and cons of online searching. Also, seeing and meeting other librarians who claim success with online searching stimulates an interest in adoption and makes it appear both more attractive and safer. Finally, the network gives the vendor a forum to display his wares. As online searching is an evolving innovation with new features and new databases being added and sometimes new fiscal set-ups allowed, it pays for librarians to stay in touch, both those who are confirmed adopters and those who are still waiting and still trying to sell the idea to their superiors and their boards.

Each adoption by an academic and special library can be attributed to the knowledge, energy, and innovativeness of a single librarian at each library. In two libraries, Cases 11 and 17, the innovative librarian achieved adoption despite top level indifference by making crucial outside contacts to bring in additional resources. In a third library, Case 14, the innovator insisted on online searching adoption as a condition of employment.

The availability of funding or subsidy from some source was an essential facilitator at all these libraries. At the earliest adopter, Case 11, external NLM subsidy primed the pump. After a year of pilot operation it looked good enough to library officials to put it in their budget. This was not so at Case 17 where adopters had to find grants, other federal programs and user fees to support the service. At the last adopting library (Case 14), a substantial bequest to the medical school and generous administration by the dean gave the librarian a free hand.

Administrative support, therefore, was a facilitator at two libraries (Cases 11 and 14) but was and remains lacking at the third library (Case 17) despite the fact that this library is the highest user of online search services.

The innovation was clearly developed precisely for the type of libraries that were sampled. Those who were aware of developments at NLM were generally eager to adopt. Relevance was self-evident, especially for researchers. There was probably a larger and more prominent research user community in Case 17 than at the other two libraries and this may account for the very early and continuing popularity of the service at that library.

At two libraries, Cases 11 and 14, we see that administrative support was probably crucial for later stages of adoption, i.e., for acceptance of the innovation as a regular part of library operations on a continuing basis. In Case 11 the innovation might have been dropped after the pilot phase had not new leadership taken over the library and supported the use of innovative technology. In Case 14 online searching came in with many other reforms, all of which brought strong administration approval and support. In Case 17 initial success undoubtedly led to faculty support within the health science units of the university, and this fact compelled the librarians to continue the service despite lack of support from the university library.

All these librarians were of the same type, special medically-oriented university libraries. The fact that Case 14 was the smallest of the three and probably the most inadequate for its users' needs at the time of adoption was probably a factor in its being last to adopt.

Fiscal issues were of some importance at all these libraries as facilitating elements. Outside funding and subsidies were critical for early adoption at the two earlier adopting libraries. A bequest and worry-free financing facilitated adoption at a third.

Attitudes, indifference, ignorance or fear of online searching technology played a role at each library, especially among older librarians in leadership roles. By the same token, orientations and attitudes favoring change (Case 14), approving contacts with and advice from the developer (Case 11) and favoring technology and technical innovations (Cases 11 and 17) were clearly evident among librarians who pushed the innovation forward and administrators who had ultimate say in implementation or continuance.

The fact that Case 11 was in close geographic proximity to the developers at NLM was crucial to its selection as a pilot site, which was itself crucial to later acceptance and continuance.

Network influences are abundantly clear at all three libraries but especially obvious in Case 17 where both the innovator and her boss, the chief of the biomedical library in the 1970s, were very active in library circles and closely allied with one another. In fact, the innovator learned about online searching in the late 1960s from courses given by her boss in the library school where he taught and where she earned her degree. In addition, her involvement in the Regional Medical Program gave her good contacts which allowed acquisition of external resources to support start-up.

Networking worked in a slightly different way in Case 14 where the search for a new librarian inevitably led to a prestigious medical school library where staff were well-versed in NLM developments. It should also be said that NLM had worked hard to establish a networking outreach program for its new services as they were developed and sought by degrees to make all biomedical libraries in the United States users of their services within a five year period through a planned sequence of seminars.

6/7. Level of Use and Operational Profile Scale

Adopters of online searching scored an overall average of 8.75 on the 0 - 11 scale indicating level of use. Some differences are observed when considering the different systems implemented by different types of library, as follows:

DIALOG	7.4
Medline	11.0
BRS	9.3

The operational profile scale varied for each innovation. The overall operational profile for online searching was 67%. However, this breaks down by specific system/service used as follows:

DIALOG	54%
Medline	81%
BRS	74%

8. Benefits

The highest reported benefits correspond to highest level of use. In Case 23's City Hall branch, benefits echo those given by the adopter in Case 17: in effect the library was transformed, library use and user satisfaction went up substantially and staff feeling of professional value and job satisfaction also increased. The library has far greater visibility and it is felt that city decision processes are now more informed and presumably better.

Gains at other public library sites are far more modest. A capacity to access a larger information base was cited by three as was the opportunity for skill upgrading through use of a computer terminal (a staff benefit). Greater speed of access was cited by only two, and two noted a potential cost saving in that certain hard copy reference sources no longer need to be maintained as standing orders.

One library also mentioned the power of searching with multiple descriptors, access to very recent material and improved service to the public as additional benefits.

Respondents in academic and special libraries varied in their inclination to articulate benefits. It Case 14, the benefit was simply summed up as "better service". At the other two libraries, however, respondents bubbled over with listings of benefits, some quite dramatic. The current director in Case 11 calls online searching "one of the truly revolutionary things to hit information science - its timely nature transcends any question of utility". Both Cases 11 and 17 cited the opening up of users horizons for sources not formerly sought. In Case 11, interlibrary loans "skyrocketed". In Case 17 it "substantially changed the way people use the library", meaning in some cases that they are sometimes in the library less often (using hard copy reference sources less and hand searching through journals less).

Our Case 17 informant also noted important benefits for the library and for herself. The library became more prominent and was put in a more direct and substantive relationship to its clients. There was also an impact on the kind of materials which were added to the collection: journal holdings and subject areas were reviewed in light of what searches were turning up and at least one new area, health planning, was singled out for special treatment with a new file.

For herself she noted four gains: first of all she found she really enjoyed doing it, but it also made her feel she had a special kind of expertise which others valued. It also brought her into closer contact with users and in many cases users who would never have showed up at the reference desk before. Finally, it gave her an opportunity to be much more active professionally, giving demonstrations and seminars on online searching throughout the university, across the state, and beyond. All these benefits appear to be both convincing and impressive. We suspect that a similar pattern has occurred at many other Medline adopter libraries.

9. Costs

The reports of the early innovators are interesting on the matter of social costs. They report that they had underestimated the amount of training that would be required and the amount of skill and on-the-job practice needed to become proficient. As one noted, "It's tough for staff who fail as searchers." These costs were undoubtedly a factor in Case 32 dropping online searching after an 18 month trial.

Even at later adopting libraries, however, there were problems with online searching trainees. Case 20 reports that online searching turned out to be more technical and difficult to learn as a skill than they had anticipated.

One policy issue in introducing online searching related to social costs is whether it should be introduced to reference librarians as a voluntary career option or as a job requirement. In Case 23 we see the effects of both patterns. In the city hall branch there was only one reference librarian and she was given no choice. Her supervisor reports that she was initially "frightened to death" by the prospect of online searching training but after two years of practice and developing proficiency she was a devoted online searching enthusiast. At the main library, online searching was introduced to the large reference staff on voluntary basis so that initially only those interested in the new technology applied for training. However, this led to the perception by non-volunteers that an elite corps of specially privileged reference librarians was being set up and a union conflict ensued, partially resolved by further orientation efforts by management and an agreement to continue online searching as an add-on duty for those who wished to perform it.

Opportunity costs associated with introduction of online searching are not as clearly articulated but are noted by some public library informants. Late adopting and non-adopting sites typically refer to the fact that other activities or innovations have higher priority than online searching. In some cases this means reserving the acquisitions budget for monographs (Case 38), in other cases for other kinds of technological upgrading such as computerized circulation (e.g., Cases 26 and 38). At the city hall branch of Case 23 the librarian indicated that she had put off a "liaison project" whereby one staff person would be attached to each government department to develop selective information retrieval plans. While this plan was shelved because higher authorities at the central library decried online searching she has nevertheless been able to initiate this liaison plan on a reduced basis. In Case 20, acquiring online searching meant acquiring fewer Apple computers (for patron use, to encourage computer literacy, not for bibliographic purposes) and more video machines. However, we found no library where opportunity costs were carefully weighed against prospective online searching benefits before a decision was made.

The first adopting academic medical library (Case 11) reports costs as "none" referring to two facts: (a) that the innovator librarian was an enthusiast from the start and that NLM absorbed all start-up costs. The last adopting library (Case 14), also reported social and opportunity costs as "none" and initial financial cost as $10,000 to join the SUNY network, through which online searching was available at that time (1975).

In Case 17 the innovator was also an enthusiast but experienced some antagonism from other librarians on campus. Furthermore, when she and her immediate supervisor decided to expand the service and train all their reference librarians in online searching there was considerable stress experienced by the reference staff, especially since some could perform much better than others.

She also reported some potential opportunity cost in that a clinical librarianship program for departments was under consideration at the time which might have been offered if they had not become committed to online searching.

Continuing costs of Medline use are approximately $20,000 per year in Case 11, largely offset now by user fees. Case 14 pays about $20,000 for all online searching services, recouping about $13,000 from users. Case 17 pays $40,000 per year for an online searching operation, nearly three times larger than that of Case 14, and as of this year breaks even with $40,000 in user fees.

10. Benefit-to-Cost Ratio

Overall, the adopters of online searching considered that the benefits had clearly outweighed costs up to the present time and they would increase in the future, as evidenced by average scores of 4.7 and 4.9 respectively.

The adopters of Medline and BRS all felt that the benefit-to-cost ratio was at the highest point (average score of 5.0) and that this would remain the case. The adopters of DIALOG considered that benefits had clearly outweighed costs in the past (average score of 4.1) and would increase over the next five years (to 4.8).

11. Continuation

Using a scale of 0 - 7 or 0 - 100 percent, to indicate the level of commitment to continued use of online searching, the following scores were derived:

● Average for all online searching	5.9 or 84%
● Average for DIALOG	4.6 or 66%
● Average for Medline	6.7 or 96%
● Average for BRS	6.7 or 96%

12. Secondary Diffusion

The only public library which exhibits a moderate amount of outreach to other libraries is Case 32, the very early adopter. They report that they "spread the word" on online searching throughout neighboring library systems with whom they form a network. Staff and former staff have also reported on their experiences at ALA and online conferences. In 1980 one former staff member wrote an information science journal article on their early experience as part of the pilot project with the vendor.

At the other large city and county systems the diffusion question is versed in terms relating to branch libraries rather than other libraries outside their jurisdiction, and even with regard to branches diffusion efforts have been modest. At the early-middle adopter library (Case 23), demonstrations have been given to all branches but emphasis has been on what online searching can not do for them. At the late adopting county library (Case 38) there have been brief orientations for branch staff, but online searching has been maintained as a low profile activity. At the middle-late adopting county library (Case 20) there have been no orientations so far for branches other than the original pilot library. Another branch in this system eager to adopt online searching has been put off.

All three biomedical libraries reported some amount of secondary diffusion effort. In Case 11 there was fairly heavy early promotion among medical center personnel including demonstrations with a portable terminal. There has been intermittent contact with other libraries on campus. This library also has fairly active continuing contact with NLM and to medical libraries, but instances were not cited where active promotion to other libraries occurred. In Case 17 active diffusion has been very much in evidence from the very beginning, both internal and external. The innovator in Case 17, who is now also the head of the biomedical library, has given repeated demonstrations and argued strongly for campus-wide adoption of online searching by this very large and prestigious public university; but she has met with continued resistance and a perception that it made sense for medically-related library, not for others.

Outside the university the Case 17 innovator has actively promoted Medline to members of the regional Medical Program including all hospitals in the state. It is not clear what the effects of such promotion have been, but at least one additional Medline service outlet was established as a result and physicians from all over the state do submit a modest volume of requests through the university facility. This innovator was also very active in professional groups by giving talks to local and regional chapters of SLA and ASIS.

At the third adopting library (Case 14) there has been some diffusion to the main library and reference staff have come for online searching training to the medical library. Nevertheless, the main library is reported to use online searching only "minimally".

General Conclusions on Online Searching

These cases of online searching show that this being an innovation has uncertain status and value to public libraries. In spite of early promotion by vendors and widespread early awareness by librarians, it diffused slowly until the beginning of the 1980s. Public libraries are ambivalent about this service: they are unsure as to what extent it is a true part of library services and how to charge off its costs. They are not sure that it should change the role of the reference librarian in any fundamental way and how to configure online searching as a service to the public.

Diffusion of online searching has only become widespread as the service configuration has been scaled down to a computer-assisted adjunct to reference work, a ready reference source to the librarian rather than a comprehensive direct service to the public. Thus, while five of the seven public libraries studied can be rated as "adopters", serious daily use is only observed at one sub-library, the city hall branch of the city library in Case 23. Even more telling is the fact that this branch really operates as a special library, serving government departments and officials with special needs.

It seems clear from the remaining cases that have Medline and BRS have been very successful innovations frm the time it was first made available in its present form. It was reported by all libraries to have a high benefit-to-cost ratio, transforming the library image and strengthenning the bond between the library and its users.

We would also surmise that the prestige and national position of the developer, NLM, had something to do with rapid diffusion, but not with the experienced benefit. NLM involvement probably guaranteed widespread early awareness and interest. NLM resources also guaranteed adoption by selected pilot libraries such as Case 11, and the NLM subsidy which provided searches on a no-charge basis through the first two years undoubtedly speeded adoption at many libraries. It also seems clear that in the long run the benefit-to-cost characteristics of online searching to subject specialist users can lead to quasi-self supporting services within a larger library context. In other words, user fees, now firmly in place at all academic and special libraries, can be used to offset line and vendor charges.

However, these cases do not give evidence that either equipment, training, start-up, space, or staff costs can be off-set in this manner.

Perhaps, for this reason none of the academic and special libraries has been very successful in spreading online searching to other libraries in their respective institutions, despite efforts invested in attempting to do so.

5.3.3 Adoption of Output Performance Measures

A total of 14 libraries provided us with case studies of adoption or non-adoption of output performance measures. Of these, seven are public libraries, three are academic and four are special libraries.

1. Cross-Site Adoption Pattern

Eight of the libraries in our case studies can be considered early adopters of output performance measures. Several of the libraries (particularly Cases 36 and 39, and to some extent, 24) were involved in the development of output performance measures for libraries, testing the measures and developing a procedures manual for implementing and interpreting the measures. This innovation is somewhat different from the two previously discussed because it is much "softer" and less well-defined.

Output performance measures for libraries have been formalized to a degree for public libraries and even less so for academic libraries. Nevertheless, many libraries were using comparative measures prior to this type of formalization. Another difference between output performance measures and the bibliographic utilities and online searching is that it is a much more recent innovation (at least in its formalized manifestation). Consequently, we decided that all adopters of output performance measures prior to 1985 were early adopters. Thus, our sample of cases includes the eight early adopters referred to above and six non-adopters.

The early adopters, as might be expected, are largely public libraries. Six of our eight cases are of public libraries. The two remaining cases include one academic library and one special library. The six non-adopters include three special libraries, two academic libraries and one public library.

2. Adoption Process Stages

Of those libraries that adopted output performance measures three were essentially pre-innovation implementers in that they were already using some form of output measures. The earliest adopter was Case 39. The whole idea of output performance measurement was stimulated by a visit to the library by a well-known library science professor (De Prospo) in 1973 or 1984. One of his students subsequently conducted some studies of the library system in Maryland and interviewed various personnel at the library. One of the thrusts of the interview was on how the collections were used. This raised an issue that had never been seriously considered before by most of the library staff. However, one of the branch librarians had begun to look at the collection in terms of stock turnover as early as 1972 and his interests raised some interest at the county level.

De Prospo's manual was given to all branches in 1974 and studied by a committee. The committee could not agree to adopt the manual's program fully and could not agree on an alternative. Nevertheless, some staff did try the manual and reported to the committee over a period of about six to seven months. By 1978 there was a considerable amount of experimentation at the different branches.

The real catalyst for the development of the more formalized set of output performance measures for public libraries was the adoption of a new long range plan for the system in 1977. This plan was important in that it helped to clarify library goals and objectives; it set up an annual review process so that progress could be measured against the plan; it required each branch to establish some form of management by objectives process; it led central staff to encourage experimentation by each branch by funding mini-projects focussed usually on one aspect of output measurement. During this period a consultant from the State Library visited the library and began to encourge the application of some of the measures in other libraries around the state.

In 1983, a second five-year planning process was initiated and library staff began to lobby for new library standards. This library became a key test environment for the proposed new standards.

The library in Case 36 applied the measures in development one year after they had first been applied at the originating library (Case 39). The librarian was active in the State Library Association and through this connection she came into contact with a former staff member in Case 39, now the new state librarian. The librarian in Case 36 was then asked to serve on the Public Library Association committee which was preparing to field test the performance measures manual. Because the library was small and the librarian was the only professional staff member she had complete control of the testing process.

Case 24 made the decision to adopt output performance measures in 1983, clearly behind the two libraries discussed above. The formally published PLA manual was distributed to all senior staff in 1983 who reacted in a variety of ways. Primary impetus came from the Director of Community Library Services who was supported by the Library Director (who had herself been involved in the development of the manual through PLA but did not aggressively promote it).

Case 54 involves a special library which had been keeping traditional library reference statistics. In late 1983 a corporate executive-level decision was made to implement a partial cost-recovery policy across the board. The library staff and users were not informed that the library and information services would be provided on a fee-for-service basis from that point forward. This imposition of a decision from above was confounded by the fact that the corporate comptroller set the library's fee schedule independent of the library staff. The situation became very difficult until the library director was able to revise the fee structure. This initiation of a charging policy was the impetus that led the library director to adopt a version of output performance measures.

The non-adopters of outut performance measures (Cases 3, 15, 33, 42, 45, 48) were at different stages in the overall process. For example, the library staff in Case 3 were not aware of some of the more formalized versions of output measures. In Case 48 the types of measures in the PLA version were not considered relevant to the organization. In Case 33 the Library Director (hired essentially from outside the library as Assistant Director one year earlier) was aware of the PLA manual and was interested in adopting them for her library. The decision had just been made to implement the measures at one branch.

Most of the non-adopters felt that the measures were not relevant to their situations. One was concerned about the amount of staff time and effort that would be involved in implementing the measures on a regular basis.

3. Adaptations

It is clear that many adaptations were made by the early developer-adopter from the time of the original introduction of the concept of output performance measures through the establishment of the published set of guidelines. However, as of that time there is generally a commitment not to make changes in the near future so that the set of measures can be as clear and consistent as possible.

The only other adaptation is really an expansion to all branches, rather than an adaptation of the measures themselves.

This lack of any real adaptations of output performance measures is partly caused by the relative immaturity of the innovation at the time of the study.

4. Barriers

The most frequently mentioned barrier to innovation adoption was staff resistance. This resistance was not usually towards the concept of output performance measurement (since we were not concerned with personnel performance measurement per se) but more towards the time and effort that would be involved and that would detract from other activities.

The second barrier was the perceived lack of relevance of the performance measures designed for public libraries on the part of academic and special libraries.

The third factor that inhibited adoption of output measures was a lack of external pressure or perceived need to do so.

5. Facilitators

A number of different types of facilitating factors were mentioned. In one library (Case 18) it was the presence of a new, enthusiastic staff person. In Case 39 it was the leadership role of library staff in the public library community, both at the state and national level, the support of the State and Federal Departments of Education, the willingness of central staff to receive input from branch staff, and the willingness of branch staff to experiment with new techniques. In Case 36 a sophisticated, numerate library board contributed to the early adopter of output measures. In Case 54 the use of automation enabled a variety of statistics to be generated so that labor time and effort was minimized.

6/7. Level of Use and Operational Profile Scale

The adopters of output performance measures scored an average of 6.4 points on the 12-point level of use scale.

The overall operational profile scores for adopters of output performance measures is 40 percent.

8. Benefits

A number of benefits of output performance measures were cited. The first set of benefits relate to library staff and internal library operations. Output measures were perceived as:

- making the library structure and operations appear more business-like
- usable as a tool for both managing the library and leveraging support for the library
- being able to act as a catalyst to prompt board members to see the need for change
- helping equalize workload in departments
- helping recognize the importance of some tasks which had previously been overlooked
- demonstrating problem areas and suggesting directions for change
- illustrating different patterns of use for different branches, different collections, different users.

A second set of benefits related to the relationship between the library and its environment. For example, output measures:

- provide a personal challenge
- recognize everyone's contributions to the library
- open library staff to new ideas
- encourage communication across departments.

9. Costs

Most of the costs associated with adoption of output performance measures were labor costs to gather and process the data necessary to generate the measures. There was some anxiety on the part of some staff members (particularly those in public services) at the beginning of implementation, but once the first sets of measures had been generated they were avowed supporters of the process.

10. Benefit-to-Cost Ratio

Overall, on a scale of 1 - 5, the adopters of output performance measures considered that benefits outweighed costs to the present time with an average score of 3.9 and that the benefits would increase relative to cost over the next five years with an average score of 4.6.

11. Continuation

Using the scale of 0 - 7 to indicate the level of commitment to continued use of the innovations, the adopters of output performance measures had an average score of 4.1 or 58 percent.

12. Secondary Diffusion

Two kinds of secondary diffusion of output measures have occurred. The first is an internal diffusion among branches. This has occurred at most of our adopting libraries.

The second kind of diffusion is on a broader scale. This level of diffusion has been achieved through informal networking (personal contacts, etc.) and more formal networking through committees, professional associations, etc. Two of the libraries studied (Cases 36 and 39) have been particularly active in disseminating information about the measures and their application.

One final mechanism for secondary diffusion that has been responsible for several adoptions is personnel migration from an adopter-developer library (Case 39).

5.4 Cross-Case Analysis by Type of Library

In the previous section we described in considerable detail the adoption process implemented by libraries of three different types: public, academic, and special. The set of 49 case studies related to seven public libraries (21 cases), six academic libraries (14 cases) and five special libraries (14 cases). In our descriptions of the adoption process associated with bibliographic utilities, online searching and output performance measures in the previous section, we pointed out distinctions by library type. In this section we focus on the quantitative rather than the narrative aspects of the adoptions by different types of Library.

1. Cross-Site Adoption Pattern

See Section 5.3

2. Adoption Process Stages

See Section 5.3

3. Adaptations

See Section 5.3

4. Barriers

See Section 5.3

5. Facilitators

See Section 5.3

6/7. Level of Use and Operational Profile Scale

The average level of use scores (on a scale of 0-11) for each type of library were as follows:

Public	7.9
Academic	9.4
Special	9.0

The average operational profile scores showed a somewhat different distribution across library type as follows:

Public	49%
Academic	55%
Special	51%

These two results indicate that academic libraries tend to be more innovative (at least in terms of the innovations we studied) than special libraries, which tend to be more innovative than public libraries.

8. Benefits

See Section 5.3

9. Costs

See Section 5.3

10. Benefit-to-Cost Ratio

See Section 5.3

11. Continuation

Using the scale of 0-7 or 0-100 percent, the levels of commitment to continued use of innovations by libraries of each type is:

Average for public libraries	4.1 or 58%
Average for academic libraries	5.0 or 71%
Average for special libraries	5.9 or 84%

12. Secondary Diffusion

See Section 5.3

5.5 Cross Case Analysis by Time of Adoption

Three different time periods of adoption were defined: early, middle and late/non-adoption. These time periods refer to the life cycle of the innovation and consequently vary for each innovation. The following time periods were defined for analytical purposes.

	Early	Mid	Late/Non
Bibliographic Utilities	1968-1977	1977-1982	1982-1985
Online Searching	1968-1975	1975-1980	1980-1985
Output Performance Measures	1982-1985		1985-

For both bibliographic utilties and online searching, innovations that have been available for over 10 years, we were able to define three periods of adoption. For output performance measures we were only able to define the early adopters and non-adopters.

In the remainder of this subsection we describe the characteristics of early adopters versus mid-adopters versus late or non-adopters.

5.5.1 Early Adopters

A total of 17 case studies were of early adoption of innovations. Five cases related to bibliographic utility adoption, four to online searching adoption and eight to output performance measures adoption. The early adopters of bibliographic utilities included one academic library, two public libraries and two special libraries. Early adopters of online searching involved two academic libraries, one public and one special. The distribution by library type differed somewhat for output performance measures with six public libraries, one academic and one special library. However, this latter distribution is not particularly unusual when related to the first formal publication of output measures by the Public Library Association.

1. Cross-Site Adoption Pattern

In reviewing the narratives of the adoption process by early adopters it became clear that we could separate out two distinct types of early adopters. The first kind are in a sense the true innovators who are actually involved in the development of the innovation (Cases 1, 11, 19, 24, 29, 36, 39). The second kind are those who adopt the innovation early in the cycle of the innovation (Cases 17, 28, 40, 54). The key factors contributing to these early adoptions of innovations included commitment on the part of individuals in leadership positions both inside the libraries concerned and elsewhere in their governance structure. Another contributing factor was personal or professional contact with developers. This was particularly the case with the developer/adopters. Finally, adoption was accelerated/facilitated by external funding (by the developer, federal or state grants, etc.). Libraries that were able to initiate a service incurring no out-of-pocket costs (there was nearly always a labor cost incurred) were generally able to implement the innovation, build up a user community and keep the service going (even though many of them had to impose user charges or fight for increased budgets later).

2. Adoption Process

In parallel with the definition of the two types of early adopters there are two basic processes of adoption that appear to be intrinsic to early adoption. On the one hand, certain librarians are involved very early in the development process, usually by participation in professional society committees or by contacts with developers. In these instances the early development-adopters are offered the opportunity to participate usually at no expense (except, as mentioned earlier, labor costs) in the development/testing/validation of a particular innovation. In each case the person most likely to be approached was either the library director or staff member at the department/division head level with close interaction with the director. Rarely are these offers of early participation rejected by directors or governing bodies. The general philosophy appears to be one of "no cost" involvement and must be beneficial to the library. The hidden costs of early participation (i.e., the labor costs) seem to either be ignored or else outweighed by the perceived benefits of ensuring development is relevant to one's own library.

The second early adoption process is much the same as for later stages of adoption in that it occurs once the innovation is available for general distribution. The early adopters have in common a strong commitment to the innovation on the part of leadership (internal and external). In many of these cases the key decision makers were aware of the innovation during its development and of the potential benefits to the library and its patrons resulting from implementation. In several cases the library conducted a study of that part of the library's service or operation that would be addressed by the innovation in order to evaluate the costs and benefits of adoption or non-adoption. If the outcome was favorable to the innovation, then ultimate adoption was a relatively straightforward decision and process. If the decision was unfavorable, presumably adoption did not proceed in the early innovation life cycle.

3. Adaptations

Most of the early innovators made no significant adaptations to the innovations. Those who adopted bibliographic utilities had adopted additional functions/service and those who had adopted online searching had in some cases instituted user charges to recover some costs (usually all except labor costs). With output performance measures the general philosophy was deliberately not to make adaptations so that the innovation could remain as clear and consistent as possible.

4. Barriers

Many of the developer-adopters did not meet any significant barriers in the adoption process. Some of the early adopters, however, did cite poor documentation, lack of instructions, and continued development of the innovation (particularly with bibliographic utilities) as barriers. Others cited the poor preparation of library patrons that changes would take place (particularly when libraries began to charge for online searching services that had been offered free of charge). In larger libraries and in libraries that are part of a larger institution, the lack of control was a problem.

5. Facilitators

The most frequently cited facilitating factor was the involvement, interest, and enthusiasm of personnel (both inside and outside the library). The actual involvement in development and participation and contacts with other professionals were strong facilitators.

Another strong facilitator was proximity to the developer or to experts who could assist with the development or adoption process itself. When this proximity was combined with a networking philosophy, the adoption process was further facilitated and promoted.

Leadership organizations' endorsement of an innovation or involvement in development played a role in facilitating adoption. Such organizations were federal agencies (e.g., NLM) and state agencies (state libraries, state departments of education, etc.).

Finally, the availability of external funding (from all types of sources) or no-charge policies for involvement in development and testing were critical factors in some adoptions.

6/7. Level of Use and Operational Profile Scale

The level of use scale is a 12-point scale ranging from 0 to 11. At the low end is a lack of awareness of the innovation and a lack of understanding of the implications of use of the innovation. At the top of the scale is more-or-less continuous use.

The early adopters scored an overall average of 10 points on this scale. However, some differences in level of use appear when early adopters of each innovation are considered separately, as follows:

• bibliographic utilities	11.0
• online searching	10.6
• output performance measures	8.8

The operational profile scales varied for each innovation because of the different types and numbers of features that could be implemented. For comparative purposes we converted the absolute scores into proportional scores so that the scale is 0-100 percent for all innovations.

The overall operational profile for early adopters of all three innovations is 53 percent. This breaks down by innovation as follows:

● bibliographic utilities	49%
● online searching	70%
● output performance measures	52%

8. Benefits

The benefits a library derives in adopting an innovation fall into two generic categories: benefits to the library and its funders in terms of improved efficiency, better quality work, etc., and benefits to the patrons in terms of improved services. Most of the benefits that can be derived are dependent upon the specific innovation in question.

Benefits of bibliographic utilities as perceived by early adopters include:

- the accessibility of other libraries' resources
- some cost savings
- improved standardization
- no great impact on library patrons
- speed of processing materials
- speed of acquiring materials on interlibrary loan
- very rapid entry into library automation
- promotion and awareness building on the potential for nationwide networking

Similarly, benefits of online searching as perceived by early adopters include:

- time savings
- making the library more prominent and forward thinking in the public eye
- opening up and increasing bibliographic instruction
- improving relationship and interdependency between libraries and users
- performing more in-depth and customized services
- providing a framework for planning based on problem encountered.

Finally, benefits of output performance measures as perceived by early adopters include:

- ability to equalize workload in the library
- recognization of the importance of some tasks that were often overlooked
- everyone's contribution to the success of the library was recognized
- ability to reduce the workload of some who were overburdened
- new activities were initiated as a result of the process of applying and interpreting the measures
- dual functionality of the measures as both a management tool and a device for leveraging support
- illustration of different patterns of use for different branches, collections and users.
- ability to demonstrate likely outcomes of management decision in terms of service provision.

9. Costs

In most cases early adopters identified the labor time involved in the development and implementation of the innovations as the main cost.

Often, they had not recognized at the time they were deciding to adopt the level of effort that would be involved. Perhaps related somewhat to these labor costs was the evidence of some fairly strong resistance to each of the three innovations on the parts of the library staffs. This not only had the effect of increasing the personnel time involvement in the adoption process, but also increased the pressure and stress on those who were responsible for the implementation process.

The individuals interviewed were unable to actually put a cost on the process, even for purchase of equipment (where appropriate). This is a fairly typical situation with libraries. However, the move towards the application of output performance measures, management by objectives techniques, business management and cost accounting techniques should result in various cost data being available in the future.

10. Benefit-to-Cost Ratio

The respondents were asked to indicate the benefit-to-cost ratio (on a five-point scale with 1 representing costs clearly outweighing benefits, and 5 representing benefits very far outweighing costs) for two distinct time periods. First, they were asked to weigh benefits against costs from the time of adoption to the present. Then they were asked to indicate their expectations of benefits relative to costs for the next five years. Overall, the early adopters considered that the benefits had clearly outweighed costs up to the present time with an average score of 4.3, and that they would continue to do so in the future as evidenced by a score of 4.4. However, in looking at early adopters of each innovation separately, some differences emerge.

The early adopters of bibliographic utilities were the only group that felt the costs would increase relative to the benefits in the future although the benefits would still slightly outweigh costs. The average scores were 4.3 from time of adoption to the present and 3.6 for the future. One of the possible reasons for this expectation of reduced benefit-to-cost ratio is in the nature of the evolution of the bibliographic utilities. In their early stages they represented relatively small cooperatives of libraries and performed certain services to meet those libraries' needs. As they grew to include hundreds and thousands of libraries and to incorporate many more functions and services, the fellowship and benefits derived from participating in a relatively small group were lost. The direction in which the utilities were developing may have been in the best interests of the majority of participants, but not necessarily of the early adopters. Another reason could be that the bibliographic utilities over a period of 15 years or so have done everything they can for the early adopters in terms of moving them towards, into and through automation in a variety of forms.

The early adopters of online searching consider benefits to have very clearly outweighed costs in the past and to continue to do so in the future. The average scores were five from the time of adoption to the present and five for the future.

The early adopters of output performance measures consider the benefits to have clearly outweighed costs in the past and to increase in the future. The average scores were 3.9 for the past and 4.6 for the future. One of the reasons for this expected increase in benefits relative to cost are that many of the early adopters of output performance measures expended a considerable amount of time and effort in developing and applying the measures, and in learning how to interpret them and to use the results in developing appropriate actions. As they become more experienced in using the measures and interpreting them, they will be able increasingly to demonstrate improvements in library service and will be able to garner more support for the future.

11. Continuation

Using the scale of 0-7 to indicate the level of commitment to continued use of innovation the following overall scores were derived:

Average for all innovations:	5.6 or 80%
Average for bibliographic utilities:	6.2 or 89%
Average for online searching:	6.75 or 96%
Average for output performance measures:	4.2 or 60%

In reviewing these average continuation/routinization scores for each innovation it is clear that the last of the three innovations to be developed, output performance measures, is the least likely to be fully integrated into everyday operations, and the scores reflect this. Both of the two other innovations are well integrated into operational practice.

12. Secondary Diffusion

One factor common to all early adopters is their active participation in secondary diffusion processes. Much of this secondary diffusion is achieved through participating in local and regional networks; participating in local, regional, statewide and national committees; presenting papers at professional meetings; hosting training sessions, visiting the library; publishing papers describing the innovation adoption and experience. Not all of the diffusion has been outwards from the library. A considerable amount of secondary diffusion has also occurred among branches in a system and between the library and its user community through publicity and demonstrations.

5.5.2 Mid-Adopters

A total of 14 case studies were of adoption of innovations at a mid-point in their life cycle. Eight cases were related to bibliographic utility adoption and six to online searching adoption. Note that we did not define a mid or late adopter category for output performance measures since they had not been available in a formalized manifestation for very long at the time of this study. The mid-adopters of bibliographic utilities included three academic libraries, two public and three special. The mid-adopters of online searching included three academic libraries, one public and two special libraries.

1. Cross-Site Adoption Pattern

The mid-adopters are clearly different from the early adopters in that although many were aware of the innovations early in the life cycle, they were unable to adopt at that time because the key decision makers were not supportive of the innovations. Two different situations existed. In one, the internal "innovation champions" of the mid-adopters were young, enthusiastic individuals who wanted to see the libraries progress. However, they were not high enough in the management structure to influence library policy. In the other situation, there was no internal supporter of the innovation and it was only when bringing on new staff (many of whom had prior experience with the innovation) that adoption could proceed. In one instance (Case 16) the decision to adopt was made externally with no consultation with the library. In consequence, there was strong resistance on the part of library staff and little commitment to the particular service (RLIN) selected.

Availability of funds was again a factor (as it was with early adoption). Sometimes the pressure to adopt and to acquire funds came from early implementers. For example, early adopters of WLN recognized the potential advantage in having the Seattle Public Library system join. So much so that they lobbied the State Librarian to make all the following year's LSCA funds available for this purpose. In several instances, grants were used for start-up cost and local funding bodies committed themselves to covering continuing costs (Cases 2 and 34).

2. Adoption Process

The adoption process of mid-adopters seems to follow a fairly regular pattern. Innovations were tracked for some time through the professional literature, demonstrations at professional meetings, and so on. Most of the mid-adopters were able to conduct fairly detailed studies of the innovations in question and to evaluate alternative manifestations of the same basic innovation. Since these mid-adopters were not at all involved in the development of the innovations, they had a much clearer picture of what the innovation was and what it could do. They were also able to contact libraries that had already implemented the innovation and to develop a clearer understanding of the actual benefits and costs, the capabilities and limitations.

The innovation adoption process itself differed from that of early adopters. Whereas, the early adopters were generally ready to move ahead with the innovation as the opportunity arose (usually because there were no out-of-pocket costs to be incurred), the mid-adopters tended to spend a great deal more time on the decision to adopt. They tended to conduct fairly extensive studies of alternatives, and costs and benefits. Even when library staff are committed, they had to go through the process of convincing their funding bodies that they were proposing a worthwhile investment.

3. Adaptations

The adaptations implemented by mid-adopters are very similar to those cited by the early adopters. For bibliographic utilities, the adaptations included more functions or more branches/libraries. For online searching, adaptations included upgrades of equipment, addition of new database services and databases, and moves towards increased specialization on the part of searchers. Two libraries (both special) cited the move towards end-user searching (which, incidentally, was receiving great resistance on the part of the end-user). Libraries experienced with online searching also recognized that not all types of searches are performed efficiently online. Quick, look-up type searches can be prepared faster using manual tools. This recognition of the inherent limitations of an innovation is seen as a major breakthrough in the adoption process. Up until this point, the innovation tends to dominate and library staff and users compromise their behavior to accommodate the innovation. Upon recognition, however, that the innovation cannot and will not solve all problems, and that there is a point beyond which use of the innovation will decrease efficiency and effectiveness, library staff generally begin to truly utilize the innovation to serve them and their patrons.

4. Barriers

Two major barriers emerged for mid-adopters: personnel and funding. The main reason why most of the mid-adopters were not early adopters was the lack of a sufficiently senior management staff member committed to the innovation. Thus, these sites became adopters either when new staff were brought in (usually with prior experience with the innovation) or when staff were promoted to leadership positions and were able to influence governing and funding bodies to adopt.

Other reasons for delayed adopters were resistance on the part of staff members and lack of support from outside the library, manifested either as indifference or as negative reactions.

Lack of available funds was also cited as a barrier. Large libraries were concerned about the potential scale of cost (particularly for retrospective conversion of their catalogs using bibliographic utilities). Small libraries, on the other hand, were concerned about the start-up costs perhaps not being justifiable because of their low volume of activity. In one case (Case 34) a group of small libraries did not have an organizational entity that could receive funds on behalf of the group until 1980.

A few other barriers were cited including the lack of good instruction and documentation, lack of a user group for interaction, and the ongoing developmental nature of the innovation.

5. Facilitators

To some extent the facilitators are opposite in nature to the barriers. Thus, the presence of supportive, enthusiatic, innovative personnel and the availability of funds are key facilitators in the process. Other facilitating factors cited included participation in regional, state and national networks, entreprenuership of staff in negotiating favorable terms for adoption, quality of services available, participatory nature of the implementation process, and institutional commitment to funding the innovation.

6/7. Levels of Use and Operational Profile Scale

The mid-adopters scored an overall average of 10.4 points on the 12-point level of use scale. This is actually higher than for early adopters, but it must be remembered that the mid-adopter group contains no adopters of output performance measures. The average level of use scores for each innovation type for mid-adopters are as follows:

• bibliographic utilities	10.4
• online searching	10.4

Each of these scores is lower than their equivalent scores for early adopters.

The overall operational profile scores for mid-adopters is 69 percent. This breaks down by innovation as follows:

• bibliographic utilities	60%
• online searching	83%

Interestingly, these operational profile scores are all higher than those of early adopters. This may appear contrary to expectations. However, many of the early adopters were able to take advantage of special arrangements to get started. They often did not conduct a thorough study of the advantages and disadvantages of the innovations to be adopted. They generally all were adopting the earliest manifestation of the innovation and, had they had more of a choice at the time, may not have selected that particular version. Mid-adopters, on the other hand, went through a very deliberate, extended decision making process, evaluating all the options. Thus, when the decision was finally made there was usually a very strong commitment to it, particularly in terms of ongoing funding.

8. Benefits

Benefits as perceived by mid-adopters were very similar to those perceived by early adopters. Only one type of additional benefit was cited by the mid-adopters. This related to the morale, personal growth and relationships among library staff. Many considered that the innovation process itself had a positive effect on staff by:

- boosting morale
- turning staff into forward-looking people

- generating interdepartmental discussion
- increasing interest and self-perception of worth to the library
- making staff feel more independent yet able to participate in decision-making.

9. Costs

Mid-adopters had as many problems outlining costs as the early adopters. The main costs perceived by the libraries (often labor costs) resulted from the increased competence of library staff after the adoption process which made them more attractive in the marketplace. This phenomenon was perceived as a cost to the library although a benefit to the library community as a whole.

10. Benefit-to-Cost Ratio

Overall, on scale of 1-5, the mid-adopters considered that the benefits had clearly outweighed costs up to the present time with an average score of 4.6, and that they would continue to do so in the future with a score of 4.5. These overall scores are very similar (although slightly higher) than those for early adopters. The pattern of perceptions of benefits to costs remains as it was for early adopters, when each innovation is considered in turn.

The mid-adopters of bibliographic utilities felt that the benefit-to-cost ratio would fall slightly in the future but the benefits would still clearly outweigh costs. The average scores were 4.3 from time of adoption to the present and 4.2 for the future.

The mid-adopters of online searching consider benefits to have very clearly outweighed the costs in the past and to continue to do so in the future. The average scores were 4.9 and 5 respectively.

11. Continuation

Using the scale of 0-7 to indicate the level of commitment to continued use of the innovations, the following overall scores were derived.

- Average for all innovations: 5.5 or 78%
- Average for bibliographic utilities: 5.3 or 76%
- Average for online searching: 5.8 or 83%

These scores fall consistently below those of the early adopters. This could be because of the significant involvement and stake those libraries had in the development process. Also, the mid-adopters are several years behind the early adopters and have not yet reached the final stages of adoption.

12. Secondary Diffusion

Although several of the mid-adopters were involved in secondary diffusion efforts, most were conducted at the local level only — to users, to branches, to other libraries in a system, etc. Very few of the librarians at these sites were heavily involved in statewide or national committees. Only one or two had written articles or made presentations at national or regional professional meetings.

5.5.3 Late/Non-Adopters

A total of 17 case studies were of late or non adoption of innovations. Five cases related to bibliographic utility adoption, seven to online searching and five to output performance measures. The late or non-adopters of bibliographic utilities include two academic libraries and three public libraries. The late or non-adopters of online searching include five public libraries and two special libraries. Finally, the non-adopters of output performance measures include two academic libraries, one public library and two special libraries.

1. Cross-Site Adoption Pattern

One of the main reasons for late or non-adoption of innovations was the perception that the innovations were not relevant either to the library's operation or to its user community. For example, in Case 31, the library did not initially adopt a bibliographic utility because it did not perform its own cataloging. Similarly, in Case 38 online searching was a service available by the State Library. It was only when these externally provided services reached such poor performance levels or were discontinued altogether that the libraries in question moved ahead with the adoption process. This lack of relevance as a reason for late or non-adoption as opposed to a lack of innovativeness on the part of the key personnel is clear, as many of these late/non-adopters were early adoption- developers of other innovations.

Funding/costs were cited as a second problem area. Only when services were made available so that the up front cost of adoption was reduced, did several libraries adopt.

In many instances, late adopters were part of a consortium or system and adopted only after others in the group had done so.

2. Adoption Process Stages

As in the previous analyses, most of the late/non-adopters were aware of the innovations for some time. However, as there were no critical needs which could be addressed or relieved by the innovations, they were not considered seriously for adoption until external conditions changed. Then, the libraries generally took advantage of their participation in consortia and networks to review available options.

3. Adaptations

Since most of these cases are non-adopters, there was little opportunity for adaptations. One library trained more staff in use of online database services, and one added a function on a bibliographic utility.

4. Barriers

Several different barriers to innovation were identified. Cited most frequently was the lack of external pressure to innovate. Related to this barrier was the feeling of loyalty to existing service providers.

The second main barrier was funding (mainly for start up) and the inflexibility on the part of some services to make special arrangements that would enable libraries (particularly the smaller libraries) to participate.

5. Facilitators

Two main facilitating factors were identified. First was participation in networks and consortia in which others had already adopted the innovation. This gave rise to the phenomenon of "copy cat" adoption. Justifications in these instances were much easier to prepare and present than those of the mid-adopters.

The other main factor is reminiscent of the internal innovation champion: the person who was aware of the innovation monitored it over time and probably actually had some hands-on experience with it. At the point in time when external services were no longer adequate, these individuals were ready to forge ahead.

Finally, other facilitating factors also mentioned elsewhere included the availability of grant funds (for start-up), willingness of some vendors to work with the libraries to find cost-effective ways to participate, and new library staff.

6/7. Level of Use and Operational Profile Scale

The late or non adopters scored an overall average of 5.3 points on the 12-point level of use scale. This falls well below the level of use for both early and mid-adopters as is to be expected. The average level of use scores for each innovation type for late or non-adopters is as follows:

• bibliographic utilities	5.7
• online searching	6.6
• output performance measures	2.75

These scores are also to be expected as bibliographic utilities and online searching have been established for a much longer time that output performance measures.

The overall operational profile scores for late or non-adopters is 34 percent. This breaks down by innovation as follow:

• bibliographic utilities	38%
• online searching	45%
• output performance measures	12%

As with the level of use scores these operational profile scores are very low relative to those of early or mid-adopters.

8. Benefits

The benefits when observed are almost identical to those perceived by the early and mid-adopters. However, several sites did mention that the benefits were not yet visible to them.

9. Costs

The costs, as in the other analyses, related mostly to labor costs and the loss of staff members with improved and marketable skills.

10. Benefit-to-Cost Ratio

Overall, on a scale of 1-5, the late adopters considered that benefits had outweighed costs up to the present time with an average score of 3.9, and that they would increasingly outweigh costs in the future with a score of 4.3. All of the late adopters considered that the benefits would remain the same or increase in the future.

The late adopters of bibliographic utilities consider the benefits to have outweighed the costs in the past and to continue to do so to the same extent in the future. The average scores were 3.7 in each case.

The late adopters of online searching consider the benefits to clearly have outweighed costs in the past and to increase in the future. The average scores were 4 for the past and 4.75 for the future.

The non-adopters of output performance measures also considered that the benefits had clearly outweighed the costs in the past and would increase in the future. The average scores were 4 for the past and 4.5 for the future.

11. Continuation

Using the scale of 0-7 to indicate level of commitment to continued use of the innovations the following overall scores were derived.

• Average for all innovations:	3.7 or 53%
• Average for bibliographic utilities:	3.0 or 43%
• Average for online searching:	4.2 or 60%
• Average for output performance measures:	4.0 or 54%

As expected, these continuation levels fall considerably below those of the early or mid-adopters.

12. Secondary Diffusion

What clearly distinguishes the early, mid and late adopters of an innovation is the extent to which they engage in secondary diffusion activities. These are virtually non-existent for late adopters. Only very occasionally will a late adopter interact with other librarians in a system or consortium and discuss the process of innovation adoption.

SECTION 6

MAJOR CONCLUSIONS

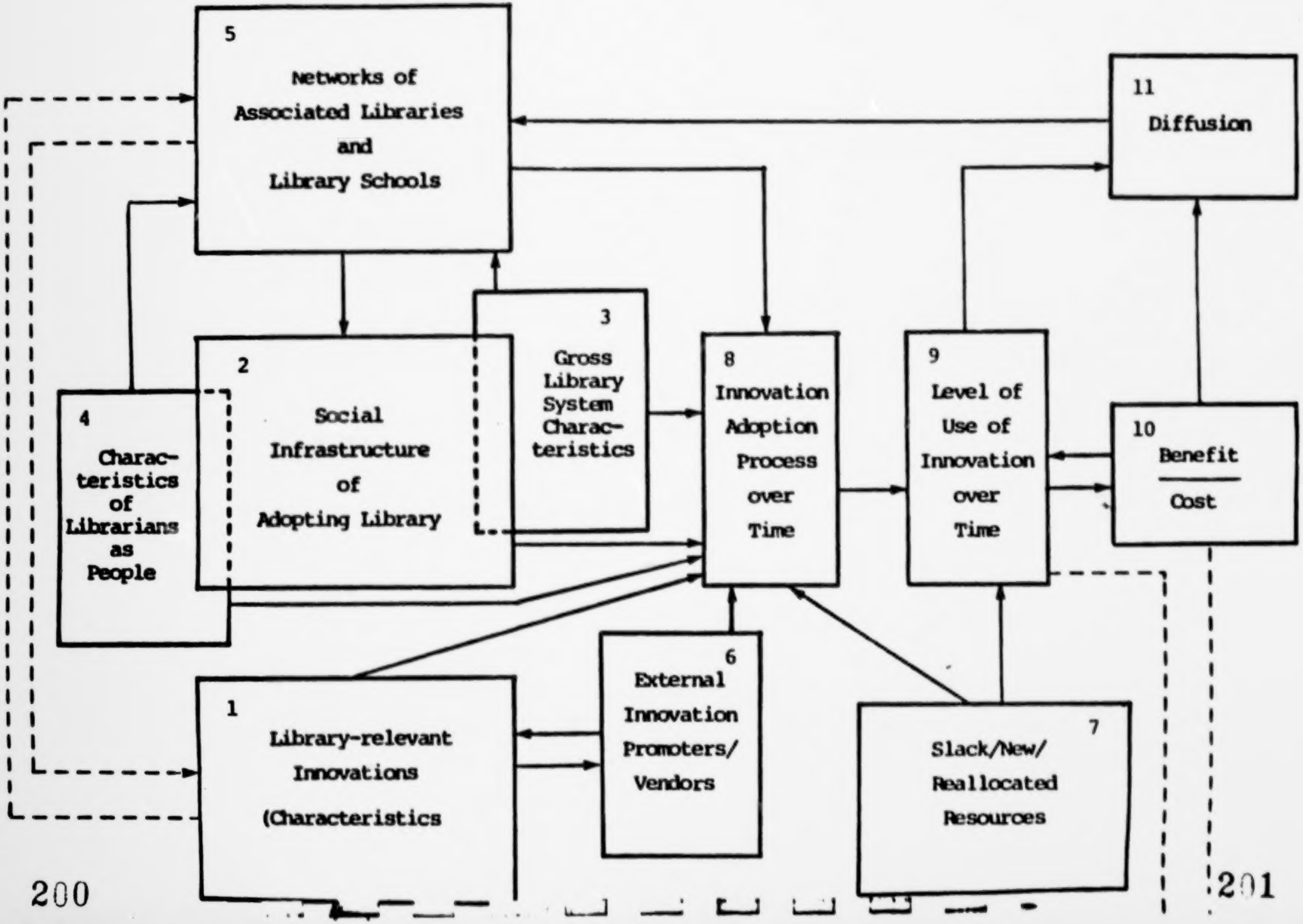
The major findings of this study, looking across 52 separate examples of potential innovation adoption in 18 different library settings, can be summarized in eleven distinct conceptual clusters of factors as illustrated in Figure 19.

The focus of this study has been the adoption process itself at each site (cluster #8) and the level and consistency of use of the innovation at that site (cluster #9). Adoption and use are seen to have a range of antecedents or causes (clusters #1 through #7) and a number of effects (clusters #10 and #11) which in turn have impact on future innovation developments and the adoption of innovations in other libraries (see right-to-left arrows). Since the primary purpose of this study has been exploratory, using case study methods which were largely open-ended and tailored to the type of library and the type of innovation under consideration, we can state no firm conclusions in a statistical form. Thus, we will summarize the findings under each variable cluster as hypotheses which might be deserving of replication or more formal quantitative testing at a later time.

At the end of this chapter we will try to draw some conclusions regarding the relative importance of different clusters and specific variables and suggest how many might be related to one another (illustrated in Figure 20)

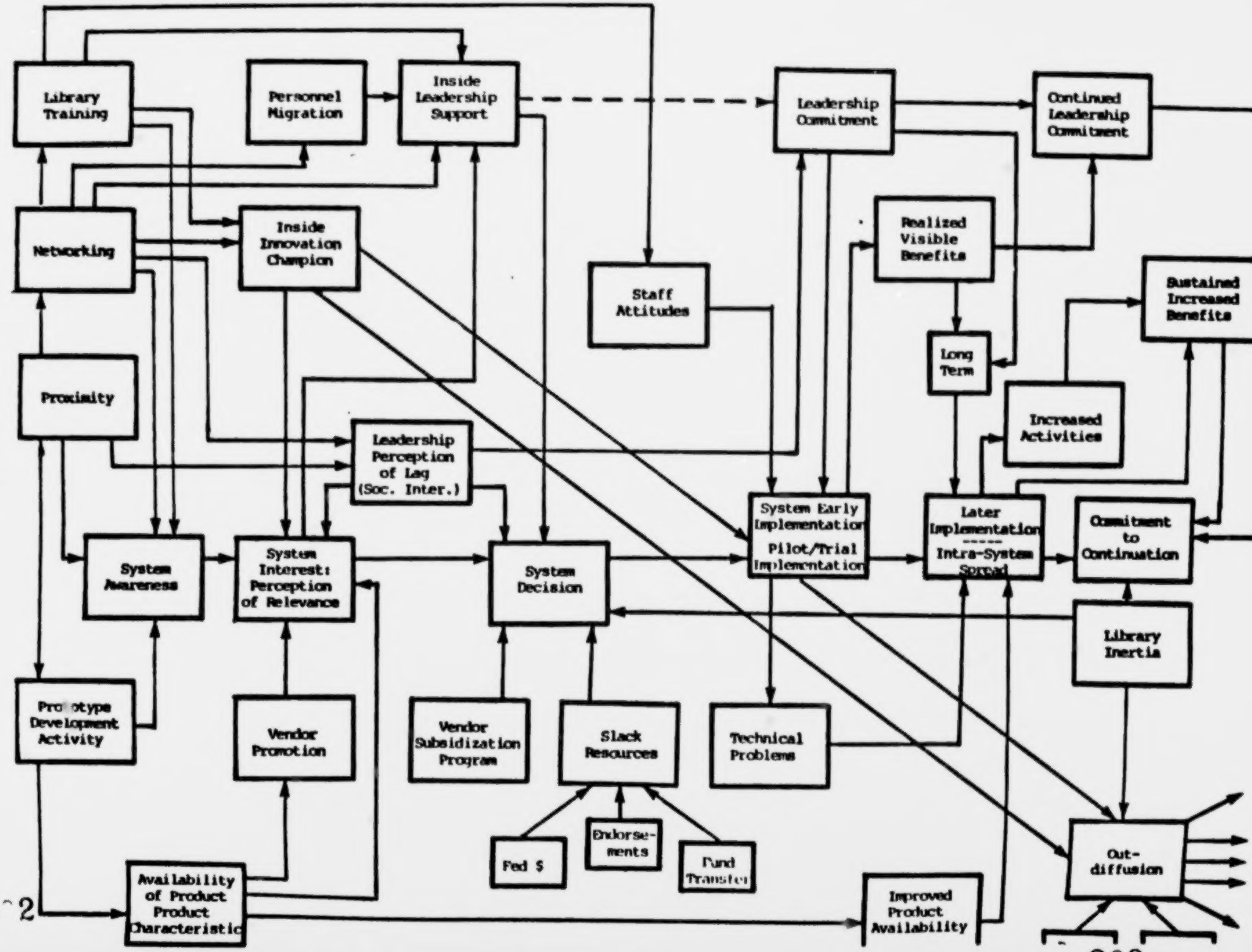
Figure 19 could be viewed as a general systems model in which the "system" is the status of the innovation at a particular site over time. Then we could view the clusters #1 through #7 as "inputs", clusters #8-#9 as "throughput" and #10 and #11 as "outputs". Among the inputs, we have identified the innovation itself as the lead item, and cluster #1 represents the characteristics of the innovation which might affect its diffusion and adoption, factors such as its relevance to library functions, its cost, its promised benefits, its complexity and communicability, etc. The three innovations we have selected for study represent a range of these attributes and some of these attributes have changed markedly over time.

Figure 19



5
Networks of Associated Libraries and Library Schools
11
Diffusion
3
Gross Library System Characteristics
2
Social Infrastructure of Adopting Library
8
Innovation Adoption Process over Time
9
Level of Use of Innovation over Time
4
Characteristics of Librarians as People
10
Benefit
Cost
6
External Innovation Promoters/ Vendors
1
Library-relevant Innovations (Characteristics
7
Slack/New/ Reallocated Resources

Figure 20


Library Training
Personnel Migration
Inside Leadership Support
Leadership Commitment
Continued Leadership Commitment
Networking
Inside Innovation Champion
Realized Visible Benefits
Staff Attitudes
Sustained Increased Benefits
Long Term
Proximity
Increased Activities
Leadership Perception of Lag (Soc. Inter.)
System Early Implementation
Pilot/Trial Implementation
Later Implementation
Intra-System Spread
Commitment to Continuation
System Awareness
System Interest: Perception of Relevance
System Decision
Library Inertia
Prototype Development Activity
Vendor Promotion
Vendor Subsidization Program
Slack Resources
Technical Problems
Fed $
Endorse-ments
Fund Transfer
Out-diffusion
Availability of Product Product Characteristic
Improved Product Availability

It is clear from our case studies that such characteristics are a major factor, probably the most important factor, in why and when libraries adopt innovations.

It is also clear, however, that the demand characteristics of an innovation are not alone what accounts for adoption and use. The innovation must be effectively communicated and the prospective adopter must receive the communication and make the appropriate decisions to bring about adoption. This receiving-decision-making apparatus we refer to here as the "social infrastructure of the adopting library" (cluster #2). Here we also find substantial variations in pattern and effectiveness as it impacts adoption. There are certain roles and relationships among adopters that appear to be very important, including people we could describe as "innovation champions", "resisters" and "supportive or resistive or acquiescent authorities".

In addition to its social infrastructure, how a system responds to innovation will be conditioned by its general type and defined mission (cluster #3) and by the specific characteristics and attitudes of its staff (cluster #4). All these clusters could further be identified as system descriptors or attributes. However, no library system exists in a social island; there are numerous influences that impinge on the physical and social environment. These include the types of community in which the library is situated, the state of the economy, the local and national political scene, and the library's clientele. In this project we have kept an eye open for the presence of this array of environmental variables to see if there are some which stand out sharply, but for the most part they have not been the focus of study. What has been of special interest, on the other hand, is how libraries and librarians affect one another through their social networks, their formal and informal associations and educational institutions (cluster #5). It is clear that there are many important ways in which such "networking" affects the innovation adoption process.

Another type of external input more closely related to the innovation itself is the specific type and level of communicative effort engaged in by the developer and associated promoters and vendors (cluster #6).

We found several instances where such an external influence stood out as a major factor, but there were fewer such instances than we expected.

Finally, an input which can be either external or internal or both is the provision of financial, personnel, or other material resources to make implementation of the adoption decision possible (cluster #7). Some innovations and some adoption configurations require substantial resources, some do not. If they do, we find that acquiring or reallocating those resources is the most serious factor impeding adoption and use. What follows is a listing of hypotheses of special interest in understanding the diffusion process within and among libraries with some judgement as to the degree of support that can be ascribed to each from our detailed analysis of the 52 cases of adoption and non-adoption among the 18 libraries studied.

6.1 Hypothesis Cluster #1: Innovation Characteristics

6.1.1 The extent of innovation development enhances the quality of adoption and use by all types of libraries. It minimizes technical problems in implementation, enhances benefit, reduces real costs, and minimizes user resistance. It is clear that more recent configurations of both online searching and bibliographic utilities have led to rapid diffusion and extended use only in the 1980s although operating prototypes of both were available in the early 1970s. Successive improvements over time made a big difference. Likewise, adoption of a meaningful set of output performance measures has only become possible with the testing and then publication of specific guidelines in the early 1980s. Although various concepts of output performance measures have been floating around library circles for more than a decade, we should not expect to see widespread evidence of their use until the current or some further developed prototype is widely diffused.

6.1.2 Downsizing is probably the most important aspect of innovation development as far as most library users are concerned, especially public and most special libraries. A key feature of the PLA's output measures guidelines was the sampling feature which allowed libraries of any size to work out measures with simple tabulations, minimal patron disruptions, and minimal staff time investment concentrated at two measurement points in the year. Online searching became more adoptable at many sites when it could be purchased on an as-needed basis without an annual subscription fee. Bibliographic utilities have become more acceptable as users have been given more options to acquire limited services on equipment that can be used for other purposes.

6.1.3 The goodness of fit to the needs of specific types of library systems is another important feature of innovation development that facilitates adoption by libraries of that type. MEDLINE, for example, was a specific online search service developed for medical research users to be adopted by biomedical libraries: diffusion was very rapid and enormously successful with respect to those users. WLN was developed as a bibliographic utility serving primarily public libraries and only within that region. It has been quite successful in diffusion and substantial use among the major public libraries of that region.

6.1.4 Collaboration with users during the development process improves the innovation both in quality and diffusability. Collaboration also compensates very early adopters for the risks they take in using untested innovations.

6.1.5 Collaboration in development with some types of user libraries may later act as a barrier to diffusion of other types. This is both a matter of technical specifics and perceptions. OCLC adoption by public and special libraries was somewhat hindered by the perception that it was primarily a tool for university libraries. Online searching has similarly been seen as a tool for researchers or, more specifically, medical researchers. This facilitated adoption by research-oriented special libraries, but impeded adoption by public and, to some extent, general university and college libraries.

6.1.6 Innovativeness does not appear from our cases to be a general user attribute but an innovation-specific attribute. In other words, early adoption of one kind of innovation does not predict well to innovation with another. Early adopters of online searching might not be adopters of bibliographic utilities; and generally the most sophisticated public library adopters of output performance measures were late or non-adoptors of the other two technologies which involved computer terminal use.

6.1.7 The benefits that accrue to the library and its staff must be made clear in the presentation of the innovation. It is not clear to most potential users of output performance measures how they can be used for personal or institutional gain. This probably hinders adoption. A somewhat similar problem attaches to online searching in that it is seen by many non-users as someting that will bring more work while not improving what they are doing now. The fact that both types of innovations in practice and in some of our cases have led to substantial gains to staff and institution is not always widely or clearly perceived.

6.1.8 An innovation should be developed in such a way that it is seen as filling or enhancing a specific ongoing function or functions within the library's current view of itself. It is true that innovations can change the way libraries view themselves but this tends to emerge after the fact of adoption and use, and such changes can be perceived as either threatening or at least confusing prior to adoption. This has been a factor in slow or non-adoption of online searching at many sites, especially among public libraries. It also helps account for its attractiveness to the special libraries. An art museum became an enthusiastic adopter of RLIN after RLIN developed software specifically relevant to art libraries' needs.

6.2 Hypothesis Cluster #2: The Library's Social Infrastructure

6.2.1 The presence of an internal innovation champion is probably the single most important factor in facilitating adoption and use, after consideration of the innovation characteristics themselves. Champions may be library directors, especially in small libraries, but they are more typically junior staff specialists who have received MLS degrees shortly before they begin their advocacy. Champions may alter and energize the library, find expertise and resources, and persuade leadership. Such a person could be clearly identified at a majority of adopting sites.

6.2.2 There must be an approving authority who is usually the chief librarian but in some instances is also an active board member or an assistant librarian or department head. The earlier the champion is able to get to the approving authority the more rapidly adoption is likely to take place after awareness and interest have been established.

Ambivalence, resistance, or even passivity by potentially approving authorities cause serious delays in adoption decisions and disrupted or weak implementation.

6.2.3 Most library innovation decisions are non-participatory as far as the majority of staff are concerned. They are usually made by the library chief in consultation with the champion (if the champion is a different person) and implementation is worked out by the champion. This is despite the fact that almost all library chiefs claim to operate in a participatory style of management.

6.3 Hypothesis Cluster #3: Gross Library Characteristics

6.3.1 Larger systems generally adopt earlier, and smaller systems later although there are exceptions to both propositions. It is probably not size per se but other things that come with size, e.g., greater resource aggregation, more staff differentiation, and more visibility to vendors, that produce this effect.

6.3.2 Larger systems have more complicated adoption decision processess which make the time between serious interest and actual adoption longer.

6.3.3 Larger systems have larger potential for scale of adoption and number of adopting subsystems. The point is almost tautological but draws attention to the fact that an important aspect of social diffusion is diffusion within a system, and in a larger system with many branches this is a very important issue. Thus, it is misleading to say that a large system which has adopted online searching as a central library service and a service at one of 40 branches counts as an "adopter" when a smaller city library which refers online searching requestors to other libraries is not.

6.3.4 Larger systems have a greater capacity to link to outside sources of knowledge through greater staff differentiation and the employment of staff with higher levels of education and stronger reputations.

6.3.5 Larger systems have a better opportunity to earmark significant slack resources for innovation through centralization of fiscal managment and aggregation of revenues.

6.3.6 Larger systems have the unique capacity to use branches or subsets of personnel as test beds for innovations without commitment of their entire system to use.

6.3.7 Academic libraries are earlier innovators than public libraries for innovations involving hard technology (bibliographic utilities and online searching); this does not seem to apply to output performance measures, nor is it clear whether special libraries are more or less innovative than academic libraries.

6.3.8 Academic library experience is an important conduit for diffusing innovations to public libraries, especially within localities.

6.3.9 Innovation diffusion within a university among branch units can be very slow or at least slower than within large public and special systems.

6.3.10 Special libraries report the most intensive and satisfactory use of online searching as an innovation and frequently report that it has substantial and dramatically positive effects on their operations.

6.3.11 The measurement of output (in terms of output performance measures) comes more readily and rapidly to the fore in special libraries operating in the private profit sector, but it appears generally to be a process of ad hoc invention at each site rather than diffusion of any particular model such as the PLA guidelines.

6.3.12 Special library networking is complicated by the fact of specialization and works best within sub-clusters of libraries of a special type (e.g., the art library cluster related to RLIN).

6.3.13 Public libraries are far more restricted in a fiscal sense than other types of libraries and this inhibits most kinds of innovation adoption.

6.3.14 Public libraries are more likely to go for innovations which have been down-sized (see again 6.1.2), partly because of 6.3.13, but also because they are more resistant to changing what they see as their proper role.

6.3.15 Public libraries continue to be ambivalent about the place of online searching in their operations, such that even when it is adopted it is often hidden from the public or not publicized and reference librarians are not rewarded for using it except as a ready reference tool.

6.4 Hypothesis Cluster #4: Characteristics of Librarians

6.4.1 Librarian attitudes or mind-sets in general do not appear to constitute a serious barrier to innovation adoption, unless those with anti-innovation attitudes are in leadership roles.

6.4.2 Attitudes of leadership staff are most important at the adoption decision stage.

6.4.3 Attitudes of non-leadership staff are most important at the post-decision implementation stage.

6.4.4 Innovation champions can usually push the system toward adoption of innovations in the face of more conservative attitudes by a majority of their peers.

6.4.5 Network involvement leads to more awareness of innovations by librarians and a more positive attitude toward them (see also 6.5).

6.4.6 A substantial number of professional librarians continue to fear the introduction of computer terminals into their work environment. Much of this fear seems to be centered on a fear of personal incapacity and failure. It tends to be more true of older librarians and those who are further removed from graduate training.

6.4.7 An important corollary to the above is that attitudes toward technical innovation by staff generally change only after they have had hands-on experience. In other words, behavior change precedes attitude change and not the other way around.

6.5 Hypothesis Cluster #5: Networking and Professional Training

6.5.1 The existing networking structures among librarians appear to work very well as linkage mechanisms for the diffusion of innovations among libraries. They work particularly well in linking library leadership and innovation champions.

6.5.2 Established professional networks among librarians serve as important linkers to and screeners of innovation inputs from vendors and innovation promoters.

6.5.3 Network involvement leads to vastly more informed decisions regarding innovations.

6.5.4 Library schools are very important conduits for innovation through the training process itself and through the placement of graduates, many of whom will become innovation champions.

6.5.5 Personnel migration is a major mechanism for the diffusion of library innovations. In other words, new staff hired from other institutions where innovations are already adopted will be inclined to introduce them in the new setting and will thus become innovation champions.

6.5.6 Later adopting sites are considerably influenced by perceptions of being late or behind other libraries which they count as their peers. This type of social pressure is amplified by participation in both local and national networks.

6.6 Hypothesis Cluster #6: Communication Activity by Promoters and Vendors

6.6.1 Aggressive marketing is a necessary aspect of diffusion of innovations to libraries, but it is generally done through established library networks and meetings. We were unable to judge how important vendor marketing was for the majority of users. It was not cited as a reason for adoption in any case and was probably most important for establishing awareness.

6.6.2 The fact that no output performance measures model has reached the point of strong promotion or marketing partly explains the minimal diffusion of this innovation to date. It is uncertain whether reliance on professional library associations alone will be sufficient to achieve widespread use.

6.6.3 Charismatic innovation promoters and advocates are very important at early stages and with very early adopters (evident for DIALOG, OCLC, and WLN).

6.6.4 Subsidization by developers is a means of achieving very early adoptions which then may serve as demonstrators for later adopters, but this strategy leaves key implementation issues unresolved (see also 6.7 below).

6.7 Hypothesis Cluster #7: Provision of Financial, Personnel, and Material Resources

6.7.1 Availability of slack* resources of some kind appears to be required for the adoption of most innovations and can be considered a "sine qua non" for innovations of a technological character.

6.7.2 Libraries vary greatly in the availability of or the ability to generate slack resources and public libraries are probably the most pressed in this regard.

6.7.3 Resourcefulness in locating slack resources is a prime attribute of the successful innovation champion.

6.7.4 Larger systems are more likely to have or are more able to acquire slack resources, especially personpower, space, or other items which can be easily hidden under existing line item budgets.

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* "Slack" means being available for allocation or reallocation to some new purpose at the discretion of the decision-maker.

6.7.5 The federal government through LSCA is the prime source of slack resources for the acquisition of bibliographic utilities by public libraries, and this fact, above all others, accounts for the widespread use of this type of innovation among public libraries.

6.7.6 Federal funds have directly and substantially subsidized the development of all three innovations studied, and have come through a variety of agencies and authorizations including NSF, NIH, and LSCA.

6.7.7 Scarcity of slack resources is the major factor behind the tendency of public libraries to go for down-sized innovation configurations.

6.8 Hypothesis Cluster #8: The Innovation Adoption Process

6.8.1 It is possible to discern an adoption process delineated by stages roughly corresponding to: (1) awareness that the innovation exists and is being used by some libraries somewhere; (2) development of serious interest in applying or adopting the innovation in your own library setting; (3) making an authoritative decision to adopt the innovation including the decision to fund it, acquire the necessary equipment and materials, and provide staff with the requisite training; (4) early implementation which may include actual training, set-up, initial promotion, and perhaps establishment as a "pilot" or on some trial basis; (5) later implementation, which represents the adjustments made as a result of initial experience, together with more intensive or more widespread utilization; and (6) commitment to continued use, including verbal commitment to continuation, survival of the innovation through a number of annual budget cycles, inclusion of the innovation in the hard money budget of the library, and permanent alterations made in descriptive materials, job assignments and requirements and training.

6.8.2 Awareness and interest stages appear to be the least problematic, apparently because of the effective functioning of the library networks previously mentioned, and also because of library credential and graduate training which increasingly reflect new technologies and because of the occupational mobility of innovators.

6.8.3 Decision-making lags behind serious interest in later adopting sites largely for two reasons: decision-makers at higher levels who are older and less oriented to innovation and less attentive to champions, and especially in public libraries because of absence of slack resources.

6.8.4 Decisions that are made in libraries regarding innovations, at least among the sites visited, are generally made on a rational basis involving a careful weighing of needs, resources, the experience of other libraries, and a consciously worked-out determination of priorities.

6.8.5 At the implementation stage, innovation champions and administrators are likely to consider the innovation as a "fait accompli" without regard to the fears, doubts, or hostility of other staff who may be involved in implementation as trainees or in other ways.

6.8.6 Generally, the above-cited "fait accompli" strategy works for those who undergo training, e.g., for use of a computer terminal. There is usually a period of strain and suffering by the affected staff member, followed in the later implementation period by a sense of mastery, increased personal value, and in some cases very strong advocacy for the innovation.

6.8.7 The pattern described in 6.8.6 is clearly not universal. Some trainees experience a continued sense of failure, particularly when comparing themselves with more successful colleagues. In many cases they resign either before or after being required to undergo training.

6.8.8 New staff are rarely hired to implement an innovation.

6.8.9 At the implementation stage what takes place could be described as a kind of "mutual adaptation" between innovation and adopting site (Berman and McLaughlin, 1975) in which the innovation is modified in various ways to be more compatible with library needs and workways while the library itself changes to conform to the requirements of the innovation.

6.8.10 Few sites reject innovations, once the decision has been made to go ahead, although many get stalled in the pilot implementation mode. We found only one instance where an early adopter (of online searching) subsequently discontinued an innovation after 18 months of trial. Eight years later it was picked up again but on a much more limited scale.

6.8.11 A corollary of 6.8.10 is that most sites move innovations into a continuation-routinization phase and exhibit their commitment in the same ways that have been found in other studies (e.g., Yin and Quick, 1977).

6.8.12 However, it seems most difficult to change line items in library operating budgets to reflect the adoption of innovations. Thus, they are usually carried out under older established budget lines.

6.8.13 Most libraries do not routinely or periodically re-examine established policies except under duress, even when they have OPM data to work with.

6.9 Hypothesis Cluster #9: Level of Use of Innovations Over Time

6.9.1 Even among adopters who are fully committed to use both, the configuration of use and the level of use varies considerably. It is therefore important to include frequency of use, quantity or volume of use, and configuration of use as separate and important dependent variables in addition to "adoption" and "date of adoption" which sufficed in traditional studies of innovation diffusion.

6.9.2 It can generally be said that factors which facilitate adoption, such as slack resources, a strong innovation, an innovation champion, and a supportive authority also contribute to higher levels of use and higher use quality.

6.9.3 By the same token, downsizing the innovation leads to lower levels of use.

6.9.4 There is no apparent relationship between time of adoption (i.e., early versus later) and either level of use or quality of use.

6.10 Hypothesis Cluster #10: Benefits and Costs

6.10.1 Adoption of the innovations studied does not generally reduce the overall operating costs of libraries and appears generally to increase them. This does not mean that they do not have the potential to reduce costs in theory nor that proper administration might in fact lead to reduced costs. However, even where specific savings were identified (e.g., in typing and card handling for bibliographic utilities, in maintaining certain reference sources in online searching) these savings were more than offset by added costs associated with the innovation.

6.10.2 Adoption of the innovations studied do not generally result in any savings in personnel requirements or workloads. In fact, they usually increase both.

6.10.3 Adoption of these innovations does not generally lead to much expansion of library budgets, and thus may lead to a thinning of library resources across all functions in light of 6.8.10 and 6.8.13.

6.10.4 Most users see benefits far outweighing costs and increasing in relation to costs over the next five years.

6.10.5 Social costs related to the introduction of computer terminals into the work place are initially heavy for non-technically oriented staff and staff who have not had prior exposure in graduate training or elsewhere.

6.10.6 The higher the level and quality of use the more able is the library to articulate substantial benefits.

6.10.7 Those who perceive substantial benefit from an innovation are likely to become strong external promoters of further diffusion to other libraries.

6.10.8 Innovations which strongly benefit patrons are also likely to provide benefits of a different kind for library staff and for the library as an institution. It is not quite so clear that innovations which benefit staff or the library are likely to spill over into patron benefits but this is probably true also.

6.11 Hypothesis Cluster #11: Diffusion as a Consequence of Innovation Adoption

6.11.1 We note a strong pattern of diffusion of information about innovations and experience with them from one library to another through established formal networks and myriad informal contacts.

6.11.2 Strong innovation champions are likely to promote library innovations to other libraries.

6.11.3 Early-middle adopters may be the strongest secondary diffusers. Evidence for this proposition is fairly weak, but it has a strong basis in diffusion theory. One case in particular (the second adopting MEDLINE site) strongly confirms it.

6.11.4 Strong supportive authorities lead to stronger internal system diffusion.

6.11.5 Many very early adopters are not effective diffusers for a variety of reasons, e.g., they may experience failure with the innovation or substantial difficulty because they are dealing with the earliest prototypes, they may represent unique circumstances of promixity to the developer or special resources and personnel which brought them into contact with the developer, but which make them inadequate role models for other libraries.

6.11.6 Later adopters feel the pressure to catch up to earlier adopters, especially within proximate or homophylous clusters.

6.11.7 Personnel migration, especially the move by innovation champions to other libraries, is a prime diffusion channel.

SECTION 7

IMPLICATIONS FOR THE DEVELOPMENT OF A DIFFUSION NETWORK

7.1 Introduction

In this study we looked at the innovation implementation processes of three types of libraries: academic, public, and special. We have additional data and insights from studies of K-12 libraries, which are quite different from the others. Together they give us an overall picture of the needs and situations of adopters and non-adopters of a variety of innovations.

Diffusion networks, most notably the National Diffusion Network (NDN), are premised on a staged model of dissemination that includes awareness, choice, implementation and institutionalization. The National Diffusion Network concentrates on the first two stages, with less emphasis on the last two. In examining the implications of our study for the design of a diffusion network, we have drawn on the experience of the NDN as an existing structure.

There would be considerable similarity to the NDN model, which has proven to be very successful in the field of education, but some departures as well, based on some of the implications of this and other studies of innovation and libraries.

7.2 Implications of the Study for Design of a Diffusion Network

There are some general conclusions that can be drawn from this study of academic, public, and special libraries that hold across organizational type. School libraries, as noted above, are an exception and will be discussed separately.

Librarians are, for the most part, aware of innovations in their field. They seek out and use information well, as befits professionals in the information business. They actively monitor developments in the field and learn about commercial innovations as they become available.

Monitoring of developments is done through a combination of formal and informal networking through professional associations and local groups and through scanning the literature of the library and related fields.

Awareness of non-commercial developments spreads through these same channels but is much less systematic. Awareness of training innovations and other implementation-related products and processes, especially those created outside commercial or other highly visible areas, is sketchy.

School librarians are often professionally and organizationally isolated from full participation in the library and information science fields. Their awareness and capacity are less well-developed overall than those of the other categories of librarian.

With the exception, then, of libraries in the education system and aside from obvious mismatches between innovation and library need, lag time in adoption and implementation is a function of factors other than lack of awareness.

Choice of an innovation is a complex process. Libraries consider their own needs and actively assess the merits of an array of innovations before making choices. They appear to study the costs and benefits of innovations quite thoroughly. However, making judgments about technology-based innovations -- understanding the implications and trade-offs of particular innovations -- is extremely difficult for the many librarians who are not technical experts. Knowing, for example, when a technology has reached the optimum cost-benefit point in its development is very difficult for a non-expert to ascertain.

It is the combination of innovation characteristics and library characteristics in particular settings at particular times that promote or deter adoption and implementation. On the library side, as we have seen in this study, a range of historical, organizational, social/psychological, and political factors may be among the variables that foster or inhibit adoption and implementation of a particular innovation. Moreover, given the costs and demands of implementing innovations, it would be difficult for a library to be actively innovative in all aspects of its operation at one point in time. Because libraries usually adopt innovations serially, an early adoption of one innovation may preclude an early adoption of another. And, because circumstances may change, adoption of one innovation does not necessarily mean that others will follow as a matter of course.

To further complicate matters, innovations — especially ones based on new technologies — themselves change over time. Changes occur in at least three ways: the basic technology itself evolves, more and different software and/or peripherals are created, the conditions and requirements for acquisition and implementation of the innovation are altered by the developer or intermediary. Shifts in any one of these domains change the configuration of advantages and disadvantages of a particular innovation, and in fact, may be so transforming that later adopters get a different innovation than earlier adopters.

In addition, each of the three innovations we studied elicited different kinds of responses from the adopting (and non-adopting) libraries. For example, online searching was viewed as an enhancement; bibliographic utilities were an enhancement for early adopters, but for others, particularly public libraries, they were the solution to quite serious backlog problems in cataloging.

In some cases, the nature of the response appeared to be a function of library type. For example, while public libraries viewed online searching as an enhancement, they had a difficult time integrating it into the heart of their operations, in contrast to many academic libraries. Therefore, for the most part, "innovativeness" should be seen as a characteristic of libraries specific to a particular innovation, not a general label. Relatively few libraries are well positioned enough to be innovative across the board — that is, to be early adopters of multiple innovations.

Key library staff can often articulate a "game plan" that maps implementation of one or more innovations phased over a period of perhaps many years, contingent on funding and other critical factors. Such plans may be formal documents or visions in a manager's head, but they put specific innovations in the context of one another and of organizational parameters. Carrying out such game plans, managing serial or simultaneous change efforts, is a major challenge. The process of innovation in libraries could be made much smoother if innovation champions knew more about actively managing implementation, from the stage of making the case for adoption through institutionalization and assessment of the new practice. Implementation skills include techniques for pursuing their roles as managers of change and orchestrating those of others in the implementation process, with special attention to the political and social issues of innovation.

Larger innovations that can be taken on in small bites are preferred to those that must be acquired in toti, especially those technological innovations that are whole systems. This conclusion directly contradicts the findings of the school improvement literature, which posit that projects that are downsized or adopted only partially lose their effectiveness. Our sense is that adopting some features of the innovations we studied is implementing on a smaller scale rather than implementing something only partially. By this we mean that some of the components of the innovation we examined were not interdependent in the way that components of educational practices so often are.

The creators and promoters of innovations should focus on making products and processes that can be adopted in components. For example, the search-only function of RLIN was very attractive to sites that wanted to try that utility before taking it on as full participants.

Being able to downsize the innovation is also important. For instance, a key feature of the PLA's output performance measures guidelines was the sampling strategy which allowed libraries to work out measures through data collection at only two measurement points during the year rather than continuously.

Organizing the innovation for implementation makes it more attractive to would-be adopters. The output performance measures guidelines are a case in point because they make it clear that an adopter can begin with one indicator, then move on to others.

Presenting innovations in components, with downsizing possibilities, and organized for implementation makes it easier for "innovation champions" in potential sites to "sell" the innovation both to library and/or parent organization decision-makers and to implementing library staff.

7.2.1 Issues in the Design of a Diffusion Network

- Because both the libraries and innovation developers are so active at the awareness stage, it is our judgment that creation of a diffusion network that would focus only on general awareness would be redundant. Therefore, we advocate a combination of strategies that target gaps in awareness but concentrate on choice and implementation assistance.

- There must be a way to accommodate both commercial and non-commercial products and processes.

  Development in the library and information science fields has a large commerical component. The National Diffusion Network is comprised almost entirely of non-commercial developers. Promoting the diffusion of commercial products and processes has a number of problems associated with it. At the same time, many of the technologies currently being acquired by libraries could not have been developed by public sector organizations.

- School libraries are a special case and need tailored support.

- Aside from regional multi-type networks, libraries of different types have relatively few means of exchange. Yet, increasingly, many of the issues they face are similar enough to warrant sharing of approaches and solutions.

- There must be a systematic way to describe innovations.

- The issue of validation of effects must be addressed.

7.3 A Proposal for a National Network for Diffusion of Library and Information Innovations

1. Create a national electronic directory of developers and innovations that can be searched by descriptors, including innovation/developer characteristics, library characteristics, etc. Technical experts could be listed here as well (see #6).

2. As part of #1, develop a series of Innovation Profiles describing the major technological innovations, including their essential elements or features, the stage of development of the technology and prospects for the future, benefits and limitations, and the requirements for implementation. These profiles would be developed in cooperation with the developers.

3. Develop a national electronic bulletin board that would allow libraries to list themselves, innovations adopted, dates, etc. Included would be a section on implementation-related products, processes developed.

4. Establish an adopter feedback process that could be informed by the national diffusion bulletin board as one input. Such a process would serve a validation function, especially for commercial products and processes.

5. As a companion piece for each of the major technologies profiled above, develop an Adopters Handbook: A Step-by-Step Guide to the Installation of (fill in name of generic product, process). This has already been done for output performance measures. Sections in the handbook would include:

   - Verification of Choice: a series of questions organized into a cost-benefit analysis to be used by library decision-makers to ensure they have made the best tentative decision given the library's perceived needs, available resources, and organizational climate.

- Planning: beginning the process of communicating information about and building support for the adoption through analysis of leadership patterns, together with first steps toward creating an overall implementation management plan beginning with the budget.

- Implementation: taking the results of the analysis of leadership patterns and implementing a reasoned communication strategy; also, organizing all major project implementation activities into a schedule; most critically, looking at the successive levels of use of the innovation and projecting the ramifications both individually and organizationally.

- Institutionalization: ensuring the long term survival of the newly adopted innovation through modification of reward structure and establishment of supportive library policies.

6. Establish three roles to assist libraries as they attempt to learn about and select an innovation. The first would be a generalist broker role on the model of the NDN's state facilitator. Because of the possibilities presented by the electronic bulletin board and directory, we advocate a single national library innovation diffusion network coordinator rather than state-based roles. Such a person would facilitate the development and operation of the bulletin board and directory, seeing that it was updated and that the needs of participating libraries were being met. The coordinator would also be responsible for the development of innovation profiles and for scheduling periodic adopters' conferences — ideally in conjunction with professional association meetings — to work face-to-face on selected choice, implementation, and institutionalization issues.

The second role would be that of technical expert. Most libraries, especially school, small and rural organizations, lack the technical know-how to evaluate an innovation and to accurately diagnose their own organizational needs. A cadre of designated technical experts could assist libraries in making intelligent choices for the long-term.

Both roles would account for promising practices in libraries and other organizations.

The third role would be that of developer, divided into developers of promising practices and developers of validated practices (see #7). Both non-commercial and commercial innovations would be included.

7. Develop a set of validation procedures appropriate to library innovations for substantiating and judging innovation developers' evidence of claims of effectiveness. Because many of the innovations are hardware-based, effectiveness may range from breakdown rates and vendor repair service capacity to evidence of streamlining efforts.

   In addition to hardware innovations, software and other products, process, and training innovations may also be validated.

8. Develop procedures for designation of certified trainers. Because so many of these innovations are technology-based, considerable specialized knowledge is required on the part of a developer or developer's designate. Libraries may exchange tips to improve their implementation, but serious trouble-shooting should be done by an expert. The national network coordinator could help diagnose the seriousness of the problem.

9. Develop appropriate assistance strategies for school libraries and school districts. There is a case to be made for treating school and district libraries in a special category. Many

libraries are small, staffed by non-MLS librarians, lack resources, and/or the support of administrations, and in other ways are isolated from the mainstream of library innovation. Moreover, innovations developed by or for other types of libraries may not be appropriate for school libraries; in a like manner, school library innovations currently in the National Diffusion Network pool of resources are tailored for education institutions. Work with school libraries should be a priority of a library innovation diffusion network.

7.4 Roles and Responsibilities for Implementation of a Diffusion Network

The major components of a library innovation diffusion network have been outlined in previous sections. They include:

- An electronic directory of developers, innovations, and technical experts;
- An electronic bulletin board for sharing by libraries at various stages of implementation;
- A national network coordinator to develop and facilitate operation of the directory and bulletin board;
- Innovation Profiles and Adopters' Handbooks for major technological innovations;
- A process for designating technical experts;
- A process for identifying promising practices;
- A process and procedure for formal validation of innovations;
- A process for certifying trainers; and
- Special strategies for assisting school libraries.

To establish the network, the U.S. Department of Education should develop an RFP that articulates a vision of such a network, the needs it would serve, and include the above components as specifications. Collaboration with the major library and information associations should also be specified, since these groups would have much to contribute to such a network.

APPENDIX A

DATA COLLECTION INSTRUMENTS

March 28, 1984

DIFFUSION OF INNOVATIONS
SITE VISIT SCREENER 1

Library name:
Location:

1. May I please speak to the library director (Ms./Mr.________________)?

   *Verify that that person is indeed the library director. If he/she is not in, ask when would be a convenient time to call back.

   When talking to the library director:

2. Introduction

   Good morning/afternoon. I am calling on behalf of King Research, Inc., in Rockville, Maryland. King Research is currently conducting a study of the diffusion of innovations in library and information science for the U.S. Department of Education. We are going to study the process of innovation in libraries and are identifying libraries to be included in our study. We are going to study three innovations in detail — bibliographic utilities, online database searching and output performance measures. Your library has been identified as an early adopter of OCLC/RLIN/WLN. Do you have a couple of minutes to answer a few questions? (If no, ask when would be a convenient time to call back).

3. Is there a staff person currently at your library who was involved in the decision to adopt OCLC/RLIN/WLN? (key informant)

Yes/No

4. Has your library adopted either online searching of commercial databases or output performance measures?

Online searching (DIALOG, MEDLINE, BRS) Yes / No

(If yes, which vendor? ________________________)

Output performance measures Yes / No

5. (If yes to either innovation in Q4 above)

When did your library adopt this/these innovation(s)?

Date for innovation 2 ________________________

Date for innovation 3 ________________________

6. Is there a staff person currently at the library who was involved in the decision to adopt this/these innovation(s)? (key informant for other innovations)

Yes __________________ No__________________

7. (If yes to either Q3 and/or Q6)

Would you be willing to let us visit your library for a day and discuss the circumstances surrounding the adoption of this/these innovation(s) with you?

Yes __________________ No__________________

Thank you for your cooperation.

March 28, 1984

DIFFUSION OF INNOVATIONS
SITE VISIT SCREENER 1A

Library name:
Location:

1. May I please speak to the library director (Ms./Mr.________________)?

*Verify that that person is indeed the library director. If he/she is not in, ask when would be a convenient time to call back.

When talking to the library director:

2. Introduction

Good morning/afternoon. I am calling on behalf of King Research, Inc., in Rockville, Maryland. King Research is currently conducting a study of the diffusion of innovations in library and information science for the U.S. Department of Education. We are going to study the process of innovation in libraries and are identifying libraries to be included in our study. We are going to study three innovations in detail — bibliographic utilities, online database searching and output performance measures. Your library has been identified as an early adopter of online database searching (DIALOG, MEDLINE, BRS). Do you have a couple of minutes to answer a few questions? (If no, ask when would be a convenient time to call back).

3. Is there a staff person currently at your library who was involved in the decision to adopt DIALOG/MEDLINE/BRS? (key informant)

Yes/No

4. Has your library adopted either bibliographic utilities (OCLC/WLN/RLIN) or output performance measures?

Bibliographic utilities (OCLC/WLN/RLIN) Yes / No

(If yes, which utility? ______________________)

Output performance measures Yes / No

5. (If yes to either innovation in Q4 above)

When did your library adopt this/these innovation(s)?

Date for innovation 2 ______________________

Date for innovation 3 ______________________

6. Is there a staff person currently at the library who was involved in the decision to adopt this/these innovation(s)? (key informant for other innovations)

Yes ________________ No ____________________

7. (If yes to either Q3 and/or Q6)

Would you be willing to let us visit your library for a day and discuss the circumstances surrounding the adoption of this/these innovation(s) with you?

Yes ________________ No ____________________

Thank you for your cooperation.

March 28, 1984

DIFFUSION OF INNOVATIONS
SITE VISIT SCREENER 1B

Library name:
Location:

1. May I please speak to the library director (Ms./Mr.________________)?

   *Verify that that person is indeed the library director. If he/she is not in, ask when would be a convenient time to call back.

   When talking to the library director:

2. Introduction

   Good morning/afternoon. I am calling on behalf of King Research, Inc., in Rockville, Maryland. King Research is currently conducting a study of the diffusion of innovations in library and information science for the U.S. Department of Education. We are going to study the process of innovation in libraries and are identifying libraries to be included in our study. We are going to study three innovations in detail — bibliographic utilities, online database searching and output performance measures. Your library has been identified as an (early/mid-late) adopter of output performance measures. Do you have a couple of minutes to answer a few questions? (If no, ask when would be a convenient time to call back).

3. Is there a staff person currently at your library who was involved in the decision to adopt output performance measures? (key informant)

Yes/No

4. Has your library adopted either bibliographic utilities (OCLC/RLIN/WLN) or online searching of commercial databases?

Bibliographic utilities (OCLC/RLIN/WLN) Yes / No

(If yes, which utility? ____________________)

Online searching (DIALOG, MEDLINE, BRS) Yes / No

(If yes, which vendor? ____________________)

5. (If yes to either innovation in Q4 above)

When did your library adopt this/these innovation(s)?

Date for innovation 2 ____________________

Date for innovation 3 ____________________

6. Is there a staff person currently at the library who was involved in the decision to adopt this/these innovation(s)? (key informant for other innovations)

Yes ________________ No________________

7. (If yes to either Q3 and/or Q6)

Would you be willing to let us visit your library for a day and discuss the circumstances surrounding the adoption of this/these innovation(s) with you?

Yes ________________ No________________

Thank you for your cooperation.

March 28, 1984

DIFFUSION OF INNOVATIONS
SITE VISIT SCREENER 2

Library name:

Location:

1. May I please speak to the library director (Ms./Mr.________________)?

   *Verify that that person is indeed the library director. If he/she is not in, ask when would be a convenient time to call back.

   When talking to the library director:

2. Introduction

   Good morning/afternoon. I am calling on behalf of King Research, Inc., in Rockville, Maryland. King Research is currently conducting a study of the diffusion of innovations in library and information science for the U.S. Department of Education. We are going to study the process of innovation in libraries and are identifying libraries to be included in our study. We are going to study three innovations in detail — bibliographic utilities, online database searching and output performance measures. Your library was selected from the American Library Directory. Do you have a couple of minutes to answer a few questions? (If no, ask when would be a convenient time to call back).

3. Has your library adopted any of the three innovations?

		Which?
Bibliographic utility (OCLC, RLIN, WLN)	Yes / No	________
Online database searching (DIALOG, MEDLINE, BRS)	Yes / No	________
Output performance measures	Yes / No	

4. When did your library adopt this/these innovations?

Bibliographic utility	________
Online database searching	________
Output performance measures	________

5. Is there a staff person currently at the library who was involved in the decision to adopt this/these innovations?

Bibliographic utility	Yes / No
Online database searching	Yes / No
Output performance measures	Yes / No

6. (If yes to either Q3 and/or Q5)

Would you be willing to let us visit your library for a day and discuss the circumstances surrounding the adoption of this/these innovation(s) with you?

Yes ________________ No ____________________

Thank you for your cooperation.

DIFFUSION OF INNOVATIONS
PRE-VISIT QUESTIONS

Name of Interviewer: **Date:**

Library name:

Library address:

1. **May we have a copy of your current organizational chart?**

2. **What is your annual budget?**

   $________________ /calendar year

   $________________ /fiscal year

   2A. How are your routine operations funded? (From what sources? What percent of annual is budget from each source, etc.?)

   Source A: ____________________ % = ______________________

   Source B: ____________________ % = ______________________

   Source C: ____________________ % = ______________________

   In addition to the above, do you also seek or acquire funds from special sources for special needs and initiatives?

	Sought (x)	Acquired (x)
Type of source: ____________________	______	______
______________________________	______	______
______________________________	______	______

3. **What population/clientele does your library serve, and what is its approximate size?**

   Population served (general description of type of clientele, organization, or locale)

   ____

   Size of population (rough estimate)

   ____

3A. Does your population (clientele) have any readily identifiable subgroups or types of patrons?

Yes ____ No ____

If yes, what are these patron types, and approximately what percent of your clientele does each of these types constitute?

Patron Types: 1. ______________________ % = __________

2. ______________________ % = __________

3. ______________________ % = __________

3B. Do any of your high priority patrons have special needs (e.g., large print books, materials in Braille, access to numeric databases, foreign language materials)? If so, what are these special needs?

Special Needs:

1. ____

____

2. ____

____

3C. Do any of your library's high priority patrons have subject-specialized information needs that are readily identifiable? If so, what kinds of subject-related information needs do you encounter frequently or cater to in your library?

Subject-related Information Needs:

1. ____

2. ____

3. ____

4. ____

4. About how much use is made of your library in a year?

Circulation/year ________

Reference requests/year ________

Walk-ins served/year ________

If there are other statistics on library use that you keep, what are some other indicators of the amount of usage of your library?

____

____

5. How large is your library in terms of collection size?

Number of: Monographs ____________

Serials ____________

Technical reports ____________

Non-print items ____________

Other (specify) ____________

6. What kinds of services does your library provide? (Check all that apply.)

A. Circulation of materials? ________

B. Interlibrary loan? ________

C. Photocopying machines? ________

D. Microform readers and/or reader-printers? ________

E. Patron-accessible computers, terminals, etc.? ________

F. Online bibliographic database searching? ________

G. Numeric database searching? ________

H. Selective dissemination of information? ________

I. Workshops, lectures, special programs? (specify)

____________________________________ ________

J. Information and referral? ________

K. Preparation of a packet of materials on a specific subject? ________

L. Bibliographies on specific subjects? ________

M. Analysis and intepretation of literature searches and/or data requested? ________

N. Other? (specify) ______________________________ ________

____

O. Have any services been dropped in the last two years? (If yes, please specify which services.)

Yes/No

____

____

P. Have any services been added in the last two years? (If yes, please specify which services.)

Yes/No

____

____

7. What kinds of educational backgrounds does the staff in your library possess?

	Number
ALA-accredited MLS	________
Non-accredited MLS	________
MLS plus other graduate degree	________
Other graduate degree only	________
Undergraduate degree	________
Students/trainees/interns	________
Other	________
Total staff	________

DIFFUSION OF INNOVATIONS

INTERVIEW GUIDE

[Reformatted Version 05/15/84]

Name of Interviewer: ______________________ Date: ______________

Library Name: ____

Library Address: ____

____

____

Persons Interviewed	Leadership	for Bib. Util.	for Online Search	for Output P.M.
Name:	________	________	________	________
Title:	________	________	________	________
Telephone Number:	________	________	________	________
Time of Interview:	____ to ____	____ to ____	____ to ____	____ to ____

I. Characteristics of Libraries

Referring first of all to your organizational chart, would you say this accurately reflects the way decisions are made in matters concerning the library, especially concerning library innovations? ________ If not, what are some modifications or qualifications to this picture that you would like to make?

____

____

____

Who are the key persons who are involved in making innovation decisions? (including those identified on the chart and any others that might play a role)

____

____

____

In what ways are they involved in such decisions? (e.g., consent, budget, sign-off, initiate, key decider, etc.)

____

____

____

How would you describe your library's orientation toward provision of service? Is it "reactive" - do you provide the information when it is requested; or is it "pro-active," that is, library products and services are suggested to users and marketed? As these two positions are extremes, where would you say that your library falls along the continuum from reactive to pro-active.

Reactive	Somewhat More Reactive	Some of Both	Somewhat More Pro-active	Pro-active
1	2	3	4	5

How would you describe the supervisory style within the library as a whole? Is the supervisory style "close", or "loose", or somewhere in between? Where would you say the style falls along a continuum from very close to very loose?

Very Close	Somewhat Close	Neither Loose nor Close	Somewhat Loose	Very Loose
1	2	3	4	5

II. Characteristics of Key Persons

What is your own educational background? When and where did you earn your degrees?

	Degree	Year	Place
1.			
2.			
3.			

About how much time per week do you spend reading professional library and information science literature?

How would you characterize yourself as a librarian? Thinking about yourself as a professional, please pick five adjectives that best describe you as a librarian.

	Yourself		The Library Staff As A Whole
1.		1.	
2.		2.	
3.		3.	
4.		4.	
5.		5.	

[Next go to innovation set
which is top priority for this site/this respondent]

INTERVIEWER'S COPY

[Give separate sheet to respondent]

Current level of use. BIBLIOGRAPHIC UTILITIES (any and all types collectively)

At the present time how would you characterize your use?

______ We use it more-or-less continuously

______ We use it daily

______ We use it at least once a week

______ We use it intermittently but several times a year

______ We have it available but rarely employ it

______ We have had it available and have used it in the past but we are not presently in a position to use it

______ We have not up to this time had it available for use

______ We have decided to adopt it

______ We are now in the process of deciding whether or not we should adopt it

______ We have considered but rejected the idea of adopting it

______ We have not yet seriously considered the possibility of adopting or using it

______ We are not fully aware of this innovation or what its implications for us might be

III. Narrative History of the Adoption Process

We would like you to tell us how your attitudes and actions have developed toward (this innovation) over time, starting with your first awareness that something like this was available for libraries up to the present. On this card (hand respondent the "stages" card) we have identified some stages that might guide your explanation; these are hypothetical stages based on how innovations have come to be adopted in many fields but they do not necessarily apply either to libraries or to this innovation in your setting. (Give a few moments for the respondent to study the card). Do you have any questions before we begin?

STAGE I

How much do you recall about when you first became aware of (this innovation)? When I say 'you' I mean anyone in your organization who to your knowledge had some role to play in the decision-making process.

(For each 'stage' or apparently discrete set of episodes, try to have the respondent clarify the following:

WHEN in terms of years or parts of a year (e.g., "early 1979")?

WHO was principally involved, organizations or persons?

WHAT happened?

WHY did the respondent think it happened (i.e., what were the apparent causes or influences on what happened?

WHAT RESULTED from the stage or episode (which should also be the transition to the discussion of the next stage)?

STAGE II — SERIOUS INTEREST/EVALUATION

Serious consideration and evaluation in relation to own situation and possible adoption up to and including the initial decision to adopt or not to adopt. [WHEN? WHO? WHAT HAPPENED? WHY? RESULT?]

STAGE III — INITIAL ACQUISITION/TRIAL

Initial acquisition of the technology, first trials, and early implementation. [WHEN? WHO? WHAT HAPPENED? WHY? RESULT?]

STAGE IV — INTEGRATION

Later implementation, integration, adaptation, up to the present time. [WHEN? WHO? WHAT HAPPENED? WHY? RESULT?]

STAGE V — DIFFUSION

Communication to others about experience with the innovation. [WHEN? WHO? WHAT HAPPENED? WHY? RESULT?]

IV. Continuation/Routinization

Adaptations and modifications (only for sometime users)

Have you made any significant modification or adaptations in your use of the innovation since you first adopted it?

____

____

Structural integration and commitment to continued use (only for current users)

Is your organization fully committed to continued use of (this innovation)?

If so, how is this commitment manifested?

____

____

More specifically:

Has your annual operating budget been altered to reflect such a commitment?

____

____

Have library descriptive and publicity materials been altered to reflect this commitment?

____

____

Have the roles and duties of library staff been permanently altered to reflect this commitment?

____

____

Have library facilities and space allocations been altered to reflect this commitment?

____

____

Have hiring, training, and continuing education requirements of any staff been altered to reflect this commitment?

____

____

Operational Profile

10.1.1 Bibliographic Utilities:

Budgetary Status

Special funding source: temporary ________
Special funding source: long term ________
Regular operating budget: line item ________
Regular operating budget: under a line ________
Annual limits on use $________

		Currently	Considered but not yet	Previously not now	Never considered
Membership/status					
Dedicated terminal(s) For your library only	Part-time				
	Full-time				
	Shared with Other Libraries				
Trained/Experienced operator(s)	Part-time				
	Full-time				
Use for (pre-order searching)	Some				
	All				
Use for acquiring items/ funds accounting	Some				
	All				
Use for cataloging	Some				
	All				
Use for retrospective conversion	Some				
	All				
Use for ILL — search for holdings	Some				
	All				
Use for ILL — place request	Some				
	All				
Use for Authority Control	Some				
	All				
Use for Serials Control	Some				
	All				
Use for Serials Union List					
Use for Collection Development					
User for Other files/ Capabilities, Specify ________________ ________________					

Reviewing this narrative history, would you say there were any over-riding issues or factors which made the innovation more difficult to adopt?

Again reviewing this history, would you say there were any major issues or circumstances that facilitated or favored adoption?

V. Outcomes

What would you say are the major benefits to you, your organization, and your client/users from adopting this innovation?

Probe: are there any additional benefits that you could characterize as "short-term"? "longer term?"

Probe: are there any additional benefits that you could characterize as "longer-term"?

Are there any significant costs against which you have to weigh these benefits? Social costs?

Opportunity costs (i.e. other things you might have done with the same resources)?

Financial costs?

Relative advantage:

To date: Weighing benefits against costs only up to the present time, would you say:

_____ Benefits very far outweigh costs
_____ Benefits clearly outweigh costs
_____ Benefits more-or-less balance costs
_____ Costs slightly outweigh benefits
_____ Costs clearly outweigh benefits

Expected: Looking into the future, assuming you continue to use (this innovation), within five years what balance would you expect?

_____ Benefits will very far outweigh costs
_____ Benefits will clearly outweigh costs
_____ Benefits will more-or-less balance costs
_____ Costs will slightly outweigh benefits
_____ Costs will clearly outweigh benefits

INTERVIEWER'S COPY

[Give separate sheet to respondent]

Current level of use. ON-LINE SEARCHING (any and all vendors collectively)

At the present time how would you characterize your use?

_____ We use it more-or-less continuously

_____ We use it daily

_____ We use it at least once a week

_____ We use it intermittently but several times a year

_____ We have it available but rarely employ it

_____ We have had it available and have used it in the past but we are not presently in a position to use it

_____ We have not up to this time had it available for use

_____ We have decided to adopt it

_____ We are now in the process of deciding whether or not we should adopt it

_____ We have considered but rejected the idea of adopting it

_____ We have not yet seriously considered the possibility of adopting or using it

_____ We are not fully aware of this innovation or what its implications for us might be

III. Narrative History of the Adoption Process

We would like you to tell us how your attitudes and actions have developed toward (this innovation) over time, starting with your first awareness that something like this was available for libraries up to the present. On this card (hand respondent the "stages" card) we have identified some stages that might guide your explanation; these are hypothetical stages based on how innovations have come to be adopted in many fields but they do not necessarily apply either to libraries or to this innovation in your setting. (Give a few moments for the respondent to study the card). Do you have any questions before we begin?

STAGE I

How much do you recall about when you first became aware of (this innovation)? When I say 'you' I mean anyone in your organization who to your knowledge had some role to play in the decision-making process.

(For each 'stage' or apparently discrete set of episodes, try to have the respondent clarify the following:

WHEN in terms of years or parts of a year (e.g., "early 1979")?

WHO was principally involved, organizations or persons?

WHAT happened?

WHY did the respondent think it happened (i.e., what were the apparent causes or influences on what happened?

WHAT RESULTED from the stage or episode (which should also be the transition to the discussion of the next stage)?

STAGE II — SERIOUS INTEREST/EVALUATION

Serious consideration and evaluation in relation to own situation and possible adoption up to and including the initial decision to adopt or not to adopt. **[WHEN? WHO? WHAT HAPPENED? WHY? RESULT?]**

STAGE III — INITIAL ACQUISITION/TRIAL

Initial acquisition of the technology, first trials, and early implementation. **[WHEN? WHO? WHAT HAPPENED? WHY? RESULT?]**

STAGE IV — INTEGRATION

Later implementation, integration, adaptation, up to the present time. [WHEN? WHO? WHAT HAPPENED? WHY? RESULT?]

STAGE V — DIFFUSION

Communication to others about experience with the innovation. [WHEN? WHO? WHAT HAPPENED? WHY? RESULT?]

IV. Continuation/Routinization

Adaptations and modifications (only for sometime users)

Have you made any significant modification or adaptations in your use of the innovation since you first adopted it?

Structural integration and commitment to continued use (only for current users)

Is your organization fully committed to continued use of (this innovation)?

If so, how is this commitment manifested?

More specifically:

Has your annual operating budget been altered to reflect such a commitment?

Have library descriptive and publicity materials been altered to reflect this commitment?

Have the roles and duties of library staff been permanently altered to reflect this commitment?

Have library facilities and space allocations been altered to reflect this commitment?

Have hiring, training, and continuing education requirements of any staff been altered to reflect this commitment?

Operational Profile

Online Database Searching:

Database Services Subscribed	Year Acquired	Year Dropped (if applicable)	Current Percent Of Use

Budgetary Status of Online Database Searching

Special funding source: temporary ________
Special funding source: long term ________
Regular operating budget: line item ________
Regular operating budget: under a line ________
Annual limits on use $________
User fees Y/N
Fee basis: ________________
Income from user fees $________
As % of online searching operating costs ________%

		Currently	Considered but not yet	Previously not now	Never considered
Service Features					
Dedicated Terminal	Part-time				
	Full-time				
Trained/Experienced operator(s)	Part-time				
	Full-time				
Advertise Service					
Search Procedure Search Request Forms					
Question negotiation					
Develop complex search strategies					
Test runs, revise strategies					
Test searching					
Identify item locations for users					
Allow direct user on-line access					
Train users for direct on-line access					
Retrieval of items for users					
Photocopy retrieved items for users					
Deliver retrieved items to users					

Reviewing this narrative history, would you say there were any over-riding issues or factors which made the innovation more difficult to adopt?

Again reviewing this history, would you say there were any major issues or circumstances that facilitated or favored adoption?

V. Outcomes

What would you say are the major benefits to you, your organization, and your client/users from adopting this innovation?

Probe: are there any additional benefits that you could characterize as "short-term"? "longer term?"

Probe: are there any additional benefits that you could characterize as "longer-term"?

Are there any significant costs against which you have to weigh these benefits? Social costs?

Opportunity costs (i.e. other things you might have done with the same resources)?

Financial costs?

Relative advantage:

To date: Weighing benefits against costs only up to the present time, would you say:

_____ Benefits very far outweigh costs
_____ Benefits clearly outweigh costs
_____ Benefits more-or-less balance costs
_____ Costs slightly outweigh benefits
_____ Costs clearly outweigh benefits

Expected: Looking into the future, assuming you continue to use (this innovation), within five years what balance would you expect?

_____ Benefits will very far outweigh costs
_____ Benefits will clearly outweigh costs
_____ Benefits will more-or-less balance costs
_____ Costs will slightly outweigh benefits
_____ Costs will clearly outweigh benefits

INTERVIEWER'S COPY

[Give separate sheet to respondent]

Current level of use. OUTPUT PERFORMANCE MEASURES (any and all types collectively)

At the present time how would you characterize your use?

_____ We use it more-or-less continuously

_____ We use it daily

_____ We use it at least once a week

_____ We use it intermittently but several times a year

_____ We have it available but rarely employ it

_____ We have had it available and have used it in the past but we are not presently in a position to use it

_____ We have not up to this time had it available for use

_____ We have decided to adopt it

_____ We are now in the process of deciding whether or not we should adopt it

_____ We have considered but rejected the idea of adopting it

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III. Narrative History of the Adoption Process

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STAGE I

How much do you recall about when you first became aware of (this innovation)? When I say 'you' I mean anyone in your organization who to your knowledge had some role to play in the decision-making process.

(For each 'stage' or apparently discrete set of episodes, try to have the respondent clarify the following:

WHEN in terms of years or parts of a year (e.g., "early 1979")?

WHO was principally involved, organizations or persons?

WHAT happened?

WHY did the respondent think it happened (i.e., what were the apparent causes or influences on what happened?

WHAT RESULTED from the stage or episode (which should also be the transition to the discussion of the next stage)?

STAGE II — SERIOUS INTEREST/EVALUATION

Serious consideration and evaluation in relation to own situation and possible adoption up to and including the initial decision to adopt or not to adopt. **[WHEN? WHO? WHAT HAPPENED? WHY? RESULT?]**

STAGE III — INITIAL ACQUISITION/TRIAL

Initial acquisition of the technology, first trials, and early implementation. **[WHEN? WHO? WHAT HAPPENED? WHY? RESULT?]**

STAGE IV — INTEGRATION

Later implementation, integration, adaptation, up to the present time. **[WHEN? WHO? WHAT HAPPENED? WHY? RESULT?]**

STAGE V — DIFFUSION

Communication to others about experience with the innovation. **[WHEN? WHO? WHAT HAPPENED? WHY? RESULT?]**

IV. Continuation/Routinization

Adaptations and modifications (only for sometime users)

Have you made any significant modification or adaptations in your use of the innovation since you first adopted it?

Structural integration and commitment to continued use (only for current users)

Is your organization fully committed to continued use of (this innovation)?

If so, how is this commitment manifested?

More specifically:

Has your annual operating budget been altered to reflect such a commitment?

Have library descriptive and publicity materials been altered to reflect this commitment?

Have the roles and duties of library staff been permanently altered to reflect this commitment?

Have library facilities and space allocations been altered to reflect this commitment?

Have hiring, training, and continuing education requirements of any staff been altered to reflect this commitment?

	No Record Kept	Raw Date = Record	Raw Stats Regular	Ratio Stats Once	Ratio Stats Regular
1. Circulation					
2. In Library Materials Use					
3. Library Visits					
4. Program Attendance					
5. Reference Transactions					
6. Reference Transactions Completed					
7. Titles Found					
8. Titles Sought					
9. Subjects Found					
10. Subjects Sought					
11. Authors Found					
12. Authors Sought					
13. Browsers: Number					
14. Browsers: Finding Something					
15. Registration of Users (lib cards)					
16. Holdings					
17. Jurisdiction Poulation					
18. Documents Delivered					
19. Speed of Document Delivery					
20. Other Measure: ______________					
21. Other Measure: ______________					
22. Other Measure: ______________					

Output Performance Measures: Special Comments

Compare measures annually

Some (specify measures)

All

Include measures in official documents and/or reports

Some (specify measures)

All

Use and interpret measures to change activities/policies

Some (specify measures)

All

Submit measures to central clearinghouses

Some (specify measures)

____

All

____

Regularly compare library measures with those of other libraries

Some (specify measures)

____

All

____

Other Comparisons:

____

____

Other Uses:

____

____

Reviewing this narrative history, would you say there were any over-riding issues or factors which made the innovation more difficult to adopt?

Again reviewing this history, would you say there were any major issues or circumstances that facilitated or favored adoption?

V. Outcomes

What would you say are the major benefits to you, your organization, and your client/users from adopting this innovation?

Probe: are there any additional benefits that you could characterize as "short-term"? "longer term?"

Probe: are there any additional benefits that you could characterize as "longer-term"?

Are there any significant costs against which you have to weigh these benefits? Social costs?

Opportunity costs (i.e. other things you might have done with the same resources)?

Financial costs?

Relative advantage:

To date: Weighing benefits against costs only up to the present time, would you say:

_____ Benefits very far outweigh costs
_____ Benefits clearly outweigh costs
_____ Benefits more-or-less balance costs
_____ Costs slightly outweigh benefits
_____ Costs clearly outweigh benefits

Expected: Looking into the future, assuming you continue to use (this innovation), within five years what balance would you expect?

_____ Benefits will very far outweigh costs
_____ Benefits will clearly outweigh costs
_____ Benefits will more-or-less balance costs
_____ Costs will slightly outweigh benefits
_____ Costs will clearly outweigh benefits

APPENDIX B

ANNOTATED BIBLIOGRAPHY AND FULL BIBLIOGRAPHY

Annotated Bibliography

Anderla, George. Information in 1985: A Forecasting Study of Information Needs and Resources. Paris: Organization for Economic Cooperation and Development, 1973.

Covers various methods of projecting the growth in scientific and technical information through 1985 and the concomitant changes in information transfer. Chapter 3 treats automation in the transfer of knowledge; perhaps by comparing Anderla's projections to what actually has happened, we may arrive at a discussion of some of the barriers to the diffusion of technological innovation he did not foresee. Rather than discussing the diffusion of specific innovation(s), Anderla has studied the future growth, diffusion and utilization of information itself.

Baker, Christine, and Eason, Kenneth. "An Observational Study of Man-Computer Interaction Using an Online Bibliographic Information Retrieval System." Online Review 5(2): 121-132 (April 1982).

A difficult to understand examination of human transactions occurring in the course of an online search, with special emphasis on man-computer interaction. As is typical in many real situations, the user did not interact with the computer terminal directly, but rather via an intermediary. Thus the complicated nature of man-computer interaction in the case of online searching can be partially explained by the fact that the intermediary and user often interacted with each other in order to interact with the computer and by the fact that the intermediary often spent time looking in thesauri and manuals and conversing with others.

Bellardo, Trudi. "Scientific Research in Online Retrieval: A Critical Review." Library Research 3(3): 187-214 (Fall 1981).

A lengthy literature review devoted to scientific research in online retrieval, rather than just online searching and/or databases. Bellardo covers the literature on this topic from 1972 through approximately 1980, comparing and contrasting topics, methodologies, and drawbacks. After a short introduction, she divides her paper into three units: Evaluation studies, use and user studies, and improving access and user aids. Studies reviewed are logically grouped together under these topics. The last unit of her review is a conclusion that constitutes a critical overview of research in online retrieval.

Berk, Robert A. The Diffusion of Information Innovations. Paper presented at the 37th Annual Meeting of the American Society for Information Science, Atlanta, Georgia, October 1974.

Berk examines the importance of awareness in the diffusion of information innovations. By increasing the awareness of potential users of information systems (which he refers to as "system interface"), the author attempted to measure the effect of this information on subsequent use of the information system" (p. 1). The information system chosen for investigation was MEDLARS (before it had become MEDLINE). The case study method was used to (1) determine users' initial awareness of MEDLARS and (2) determine whether changes in adoption patterns had a relation to exposure (or system interface) provided via different means. Exposure was provided by means of a change agent or person providing information about the innovation as well as via slide-tape presentations and published guides. While differences in adoption rates due to different types of exposure were not significant, overall adoption periods were shortened in response to exposure and the overall number of adoptions were higher in the "exposed group" vs. the control group.

Bodenstedt, A. Andreas. "The Challenge of Agricultural Mechanisation to Rural Sociology." Sociologia Ruralis 21(1): 43-56 (1981).

Agricultural innovations in LDC's, according to the author, have failed to be adopted on a large scale due to their inappropriateness for the host society. That is, Bodenstedt puts forth the notion that developers and marketers of agricultural innovations in LDC's have presumed a social structure consistent with that existing in industrialized nations and have regarded failure of their innovations as due to lack of progressiveness on the part of the farmers. "Changes in the social order" resulting from adoption of agricultural innovations are "regarded as unexpected effects" (p. 50). Based upon his knowledge of agricultural, economic and social conditions in LDC's, Bodenstedt illustrates how the small farmer's frequent lack of interest in adopting agricultural technology should not be regarded as resistance, but rather as the small farmer's reluctance to invest money and time and effort to effect a change that will clearly be several years in "paying off" if it pays off at all. (Bodenstedt demonstrates, based on hypothetical rates of farming self-sufficiency calculated against increased costs and productivity, the approximate time frames before mechanization becomes feasible).

Branscomb, Lewis and Rogers, A. Robert. "The Conception and Birth Pangs of OCLC — An Account of the Struggles of the Formative Years." College and Research Libraries 42(2): 303-307 (July 1981).

One of few accounts that discusses the pre-1967 developments leading up to the formation of OCLC. Branscomb and Rogers, both involved in those "earliest days" not only report the events, but also shed light on why things happened when and how they did.

Burns, Robert. "Library Use as a Performance Measure: Its Background and Rationale." Journal of Academic Librarianship 4(1): 4-11 (March 1978).

This paper discusses the utilization of use studies as library performance evaluation measures. Difficulties and drawbacks as well as assumptions underlying use/user studies are covered by the author in a logical, detailed manner, as are data requirements and types of measures. Burns concludes by pointing out areas where research is needed in terms of use/user studies.

Burns, Robert W., Jr. Library Performance Measures as Seen in the Descriptive Statistics Generated by a Computer Managed Circulation System. Fort Collins, Colorado: Colorado State University Libraries, 1975.

In an interesting but limited report, Burns examines the collection of library circulation statistics in 24 academic libraries with automated circulation systems. The author investigated the kind of data generated, the frequency at which it was generated, and the use to which these data generated from the automated circulation system's computer were put. His main thrust was to discover how these circulation statistics were being used as performance measures to improve the management of the circulation system and of the library as a whole.

Burns is one of few authors encountered to explicitly subdivide library performance measures, stating: "performance measures are measures of output or service. They can be subdivided into effectiveness measures or efficiency measures." Effectiveness measures measure the extent to which something fufills a goal, mission, objective, etc., while efficiency measures are operationally oriented and measure outputs in terms of units, according to the author. This study mainly looks at efficiency measures (p. 5).

In examining the reasons why such statistics were collected, how they were collected, and what they were used for, the author has raised some interesting points: 1) often, there was a lack of rationale for the statistics collected, or one was arrived at after data collection had begun (p. 17), 2) there was no relationship between the sophistication of the statistical data and reports generated by the system (p. 18), and 3) often, managers were hampered by the inflexibility of the statistical reporting capabilities of their circulation systems, both in terms of time interval frequency and level of detail.

Although Burns does not truly discuss the production of output performance measures from automated circulation systems in terms of library effetiveness, this report raised issues in 1975 that may still be quite relevant today. While Burns' recommendation that a generic management information system be developed for academic libraries (p. 43) may be neither appropriate nor feasible, that librarians may not be fully aware of and/or prepared to utilize existing and ever-increasing automation in these libraries as one way to facilitate the planned gathering of library performance data on a rational basis may be an area that bears further investigation with regard to the adoption of output performance measures.

A thorough but dated literature review covering the application of statistics to library management and evaluation is included.

Burt, Ronald, S. "Innovation as a Structural Interest: Rethinking the Impact of Network Position on Innovation Adoption." Social Networks 2(4): 327-355 (December 1980).

In this lengthy paper stemming from the literature on adoption of innovation written "within the discipline" of sociology, the author looks at social integration as a factor in the adoption of innovation, particularly at the structural aspects of social integration and how they relate to the perception of utility/advantage in the adoption of innovation. The author investigates his theories by looking at social integration (structural network position) in the adoption of medical innovation, testing his hypotheses via the use of algebraic equations.

The article's abstract states:

> "the act of adopting an innovation is argued to be a type of structural interest. The proposed conception of innovation

as a structural interest describes how a potential adopter perceives utility in innovating as a function of his position in network(s) of relations with other potential adopters" (p. 327).

The reader is referred to the body of this abstract for clarification of this highly technical study.

Christenson, J. and Taylor, Gregory. "Determinants, Expenditures, and Performance of Common Public Services." Rural Sociology 47(1): 147-163 (Spring 1982).

The authors of this paper "...stud[ied] the relationship of per capita expenditures as an input measure with two output measures, an objective performance measure and a subjective measure of citizen's perceptions for five public services..." (p. 147). This paper is relevant to our study of the diffusion of innovation in library and information science in that one of the public services studied was public libraries. Christenson and Taylor test the following relationships: "(1) the effect which antecedent variables have on a) expenditures, b) objective performance measures, and c) subjective quality of public service measures; (2) the effect which expenditures have on: a) objective performance measures and b) subjective quality of public service measures; and (3) the effect which objective performance measures have on subjective measures of public services" (p. 152). Number of books per capita was chosen as the objective indicator for public libraries, which was found, not surprisingly, to correlate strongly with local income level as an antecedent variable when libraries were heavily dependent on local funding. The authors found that "only in the case of public libraries does the measure of service input (per capita expenditures) have a significant unique effect on output" (p. 158).

Chweh, Steven. "User Criteria for Evaluation of Library Service." Journal of Library Administration 2(1): 35-46 (Spring 1981).

The author mentions three levels at which library services can be evaluated: 1) effectiveness, 2) cost-effectiveness, and 3) cost-benefit, citing F.W. Lancaster (p. 36). Chweh's study, however, is concerned with the first level — that of effectiveness. He states: "the main purpose of this study is to identify a set of important criteria conceived by library patrons in judging a 'good' library. The secondary purpose is to develop a measurement model for evaluation of library service based upon the identified set of user demands" (p. 37). Chweh then goes on to explain his procedures for identifying users' library service criteria: he sampled a number of users from public, academic, and school libraries in the Los Angeles area as to what they felt were important criteria for a "good" library. The data collected were analyzed and grouped into common categories, and then ranked by frequency (number of times category was mentioned as a criterion). Not surprisingly, users listed availability of books and periodicals, and stressed different aspects of library reference service (quality, collection, friendliness of service, etc.) as important to making a library "good". The user-identified criteria are ranked and shown in table 1, (p. 40-41), and a model questionnaire by which users could actually evaluate library services on the basis of criteria they had chosen is included.

Clark, Phillip M. A Study to Refine and Test New Measures of Library Service and Train Library Personnel in Their Use. New Jersey Measurement Study. New Brunswick, New Jersey: Rutgers, The State University Bureau of Library and Information Science Research, 1976.

This lengthy volume describes a 1974-1975 study of library performance measurement conducted in New Jersey public libraries. Directed by Ernest De Prospo, the study's objectives included the implementation and testing of the reliability of measurement techniques developed earlier for the PLA/ALA measurement study, the identification and development of new measures of library service for public libraries in New Jersey, and the development of training/educational programs derived from the implementation of measurement tools designed to enhance the data collection and analysis abilities of library personnel (overview, pp. 1-10).

This study is somewhat different from other similar studies of library performance measures in public libraries conducted in the early to mid 1970's in certain ways. In this project, the manual was refined and instructions written explictly with detailed worksheets, enabling participating libraries to tabulate and analyze their own data, rather than sending the data to a central location for processing. Too, the results for each measure are presented not just in a descriptive fashion, but with a critical eye toward the need for future refinement and continuing implementation feasibility for libraries of all sizes. Also not to be disregarded are the project team's recommendations concerning the role of the State Library in the adoption of library performance measures. Covered in these were a recommendation that the State Library, require, as part of the customary statistics collected from public libraries, the use and inclusion of performance measures described in this study, and the recommendation that the State Library support continuing assistance in the use of the methodology and techniques pertaining to library performance measures via a variety of continuing education programs.

Clayton, Audrey and Nisenoff, Norman. Potential Impacts of Automation and User Fees Upon Technical Libraries. Arlington, Virginia: Forecasting International, Ltd., 1977.

As the authors state, this report is not an actual prediction of the effects of fees for service and automation of technical libraries, but rather a study of the potential changes that could occur as a result of these innovations. Though published in 1975 and somewhat dated in terms of the current levels of diffusion of the innovations treated, the authors describe a very interesting study methodology which has implications for our project; the impacts are viewed within the context of the whole library environment, which is then broken down into separate components or variables. The variables include type of library, size of library, users, and suppliers. These components are then further broken down into even smaller units, e.g., type of information service, type of user, etc. The study team then attempted to describe the presence/absence of impact of the innovation in matrix form, and from there, went on to discuss the type of impact. Most importantly contradictory impacts and complex, convergent impacts as foreseen are discussed. This approach may be useful to us in that this forward-looking treatment of potential impacts of innovation can be viewed as one way of looking at the decision-making process about whether to adopt an innovation, how to implement it, and what potential (internal and external) changes may be necessary to smooth the transition into the "full utilization phase".

Recommended reading.

Darley, J. and Beniger, James. "Diffusion of Energy-Conserving Innovations." Journal of Social Issues 37(2): 150-171 (1981).

Darley and Beniger look at the decision to use residential energy conservation measures as an example of the decision to adopt an innovation. The authors examine the diffusion of energy conservation measures in light of both personal and demographic characteristics of the people involved and in light of Roger's perceived characteristics of an innovation (p. 153). They conclude that perceived characteristics of an innovation are a much better predictor of whether or not it will be adopted. The authors further extend and modify Roger's characteristics in order to better evaluate the adoption or diffusion of energy conserving innovations (p. 155). Study of the adoption and diffusion of energy conserving measures according to their perceived characteristics as innovations as communicated via social networks (rather than the mass media) is proposed and outlined.

Detweiler, Mary Jo. "Planning -- More Than Process." Library Journal 108(1): 23-32 (January 1, 1983).

In this paper, Detweiler concentrates primarily upon a critical review of: A Planning Process for Public Libraries (ALA, 1982), but in the process, makes some interesting comments about the public library planning process itself, and by inference, the use of performance measures. She states that identification of the library's specific mission (and therefore its translation into goals and objectives) must precede and outweigh data collection activities. By defining the mission, one is therefore able to define the research problem, and less likely to indiscriminantly collect useless data about the library. Nor should "outside variables" such as the library's political environment, etc., be ignored in the planning process. The importance of modification of the "planning process" to suit the individual library and strategies for the implementation of change leading to the attainment of library objectives are also stressed by the author.

DeWath, Nancy Van House. "Fees for Online Bibliographic Search Services in Publicly-Supported Libraries." Library Research 3: 29-45 (1981).

DeWath investigates the presence of fees and fee-charging policies in publicly-funded libraries (primarily public and academic) in California. Of the libraries surveyed providing online bibliographic searches, some actually provided them in-house, while others referred the users to other libraries. Whether or not the search was performed in-house tended to be an important factor in the fee-charging policy. In the instances where a fee was charged, the survey investigated whether or not the library differentiated among user groups (no fees to certain groups; fees to all but some users charged more than others, etc.). In addition to where the search was performed, "another factor that could affect the decision to charge was the extent to which the search was seen as an aid to the librarian, or to the user" (p. 38). When the decision to have a search performed was the user's, the user was asked to pay in the majority of cases (versus the library). When the librarian decided to perform the search, the library usually did not charge the user. DeWath also investigated the ways in which libraries base their charges. Charges tended to be based on direct costs incurred by the library.

A useful discussion of the implications of the study follows a summary of the results.

Drake, Miriam and Olsen, Harold A. "The Economics of Library Innovation." Library Trends (28): 89-103 (Summer 1979).

Drake and Olsen state: "this paper is concerned solely with the economics of innovation in academic libraries. The purposes of this paper are to present: (1) a review of the economic literature dealing with innovation, (2) a review of the economic environment and structure of libraries and their relationship to innovation, (3) a discussion of sources of capital for libraries, (4) the economic character of innovation, and (5) innovation in libraries" (pp. 89-90). In addition to accomplishing their purposes (with the limitation that they treat only academic libraries), the authors make a number of salient points: "managerial effectiveness is a major determinant of innovation's success or failure" (p. 98), "the sources of innovation [for libraries] are likely to be byproducts or extensions of innovations created by or for the publishing, communications and computer industries" (p. 100). They also discuss the importance of library networks as "carriers of innovation" as well as institutional innovations in their own right.

A unique, thought-provoking article that makes certain points that can be generalized to libraries as whole. Highly recommended reading.

Drake, Miriam A. "Managing Innovation in Academic Libraries" College and Research Libraries 40(6): 503-510 (November 1979).

Drake's paper treats the managerial aspects of dealing with innovation in academic libraries. Within the context of organizational change, she discusses the need to plan, to take risks and accept the consequences, factors that influence the success ("adoption") of innovation and its benefits and impact. Although Drake does not discuss the diffusion of innovation in academic libraries, she presents a thoughful analysis of the topic of innovation (as opposed to a discussion of specific innovations) within the environmental parameters of academic libraries.

Eaker, R. and Huffman, J. "Research into Practice: The Consumer- Validation Process." Action in Teacher Education 4(1): 36-40 (Spring - Summer 1982).

The authors describe a process by which the dissemination of educational research and its acceptance into classroom practice (which, for our purposes, can be regarded as the diffusion and adoption of instructional innovations) are improved. The Consumer-Validation Process, where the classroom teacher is regarded as the consumer, also referred to by the authors as the Murfreesboro program, involved: the testing of research results applicable to classroom teaching by actual teachers, asking the same teachers to evaluate the research findings, having the teachers record their classroom behavior when implementing the research findings, and having the teachers analyze their thoughts and feelings about what happened when they attempted to implement the research findings in their classrooms. Considerable time and effort was involved in initially presenting the research results to the teachers, in providing reassurance, assistance and suggestions in the classroom, and in convening seminars and meetings whereby the groups of teachers could share ideas on the effects of implementing the research findings and ways in which to do so. Therefore, it is not surprising that the Consumer-Validation process was successful in increasing teachers' willingness to adopt research innovations.

East, H. "Comparative Costs of Manual and On-Line Bibliographic Searching: A Review of the Literature." Journal of Information Science 2(2): 101-109 (September 1980).

In a paper derived from a review of published literature on the comparative costs of manual versus online searching commissioned by the Research and Development Department of the British Library, East covers "...three aspects of the problem [of manual versus online searching]:

(a) the comparative costs of online versus manual bibliographic searches,

(b) the relative effectiveness of the two approaches (in terms of pertinence, recall, timeliness, etc.),

(c) future trends which may affect costs of online searching" (pp. 102-103).

The author is careful to point out the lack of comparability in terms of how searches were costed and in terms of how retrieval effectiveness was calculated (p. 102) in the published literature, as well as inappropriate comparisons, e.g., searches, that for various reasons, could not have been conducted both online and manually. By voicing what he feels to be the reviewed authors' assumptions and missions in comparing the cost and effectiveness of online searching to manual searching, East provides useful information for those who might wish to make this comparison for their own institutions. This article also includes a well-reasoned discussion of the many variables which could influence the future costs of online searching.

Fenichel, Carol Hansen. "Online Searching: Measures that Discriminate Among Users With Different Types of Experiences." Journal of the American Society for Information Science 32(1): 23-32 (January 1981).

Fenichel's article presents the results of her investigation of behaviors associated with success in online searching. Her "... research objectives were (a) to identify behaviors that differentiate among searches of persons with different amounts of overall experience and (b) to identify behaviors that differentiate between (1) searches of persons who are searching a database with which they are familiar, and (2) searches of persons who are searching an unfamiliar database" (p. 24). The author clearly and thorougly describes the methodology and results of her study, furnishing definitions for measures used and stating underlying assumptions. Specific behaviors associated with success in online searching do not appear to be clear-cut in all circumstances. Both the level of overall searching experience and familiarity with the specific database used in Fenichel's study, ERIC, appear to influence searchers' behavior. However, a large degree of individual variation was found in the search strategies used (surprisingly enough, those not familiar with the ERIC database were found to use more free text terms and those who were famimlar with the ERIC database were found to rely more heavily on the use of thesaurus descriptors), with simple techniques predominating and modification of search strategies rarely occurring.

Ford, Joseph. "Network Service Centers and Their Expanding Role." Information Technology and Libraries 1(1): 28-36 (March 1982).

Describes the activities of OCLC-distributing networks, which Ford refers to as "network service centers." Although these organizations evolved in order to broker OCLC services on a state or regional level, the results of the author's survey show that they frequently provide non-OCLC services and that this is an area of increasing interest for these networks in the future. Network directors were asked about growth areas, funding sources, uses of members' records on OCLC tapes, and acting as an "intermediate" database vendor. Ford's article shows that there is a great deal of activity going in this type of network, much of it directed toward increased independence and non-OCLC provided services. The survey questionnaire is included as Appendix 1.

One of few articles thus far encountered that looks at this kind of library network. Recommended reading.

Glaser, Edward M.; Abelson, Harold H.; and Garrison, Kathalee N. Putting Knowledge to Use: Facilitating the Diffusion of Knowledge and the Implementation of Planned Change. Washington, D.C.: Jossey-Bass Publishers, 1983.

This lengthy monograph treats various aspects of the diffusion and utilization of knowledge in dealing with change, particularly innovative change. As opposed to Rogers' work (The Diffusion of Innovations), the authors do not focus specifically on the diffusion of innovation, but rather on the roles that knowledge plays in various disciplines with regard to deciding whether or not and how to change, planning for change, adoption/adaptation of change, and implementation of change. However, it is especially interesting to note that there is some overlap between the concepts discussed in this work and Rogers' work (although the terminology used is frequently different), e.g., the grouping of determinants of variables dealing with "the effective use of knowledge" (p. 422).

Organized into three multiple chapter sections (factors influencing knowledge utilization and change; stages in problem solving, knowledge utilization, and planned change; and linking knowledge with potential users), this volume is a rich compendium that builds upon cross-disciplinary literature reviews conducted by the authors. An extensive bibliography is included.

Although this reader only skimmed through this book, it is readily apparent that certain chapters stand out as particularly important: 1) chapter 7, stages in processes of knowledge utilization and change; 2) chapter 12, means of communicating knowledge; 3) chapter 14, relating research and development to practice; and 4) chapter 16, improved knowledge utilization - highlights, guidelines and prospects.

Gupta, B.M. "Information, Communication and Technology Transfer: A Review of Literature." Annals of Library Science and Documentation 28(1-4):1-13 (March-December 1981).

Gupta's article reviews the literature covering a small but specialized segment of the larger diffusion of innovation picture: the author discusses works treating the importance of information and the communication process in technology transfer. While perhaps difficult for the layperson to understand, Gupta's presentation summarizes and compares and contrasts others' theories concerning (1) information as a stimulus to innovation and (2) the relative importance of different types of information during different phases of the technology transfer processes.

The article's abstract states: "defines the concepts of science, technology and technology transfer. Describes the three stages in technology transfer, namely idea generation, problem solving, and implementation and diffusion. Discusses types, sources and channels of information used under the above three stages of technology transfer" (p. 13).

Harter, Stephen P. "An Assessment of Instruction Provided by Library Schools in On-line Searching." Information Processing and Management 15(2): 71-75 (1979).

Reports the results of a survey of online searching instruction provided by ALA-accredited library schools. Harter's paper also includes a closer look at one library school: a case study of online searching instruction at the University of South Florida is provided. Survey results showed that although education in online searching is widely available, it differs greatly from institution to institution, in terms of methodology, data bases, vendors, connect time, and so on.

Huston, Mary M. "Fee or Free: The Effect of Charging on Information Demand." Library Journal 104(16): 1811-1814 (September 15, 1979).

Discusses the role of cost to the user in the demand for online searching of bibliographic databases. Fee policies in libraries vary greatly from subsidization to direct cost recovery to even fees for all direct and related costs. Changes in demand after a fee for online searching was instituted are discussed in terms of a review of relevant studies. The author found that instituting a fee where there had not been one previously tended to reduce demand, while instituting a subsidy where it had previously been absent tended to increase demand. "In addition, data indicates that user fees also have a significant influence on demand by those individuals who could pay for the information services, but are unwilling to do so. Little information is available, though, on the effect fees have on volume of demand by specific classes of users" (p. 1813). The author also discusses the lack of true user orientation in bibliographic data base structure and searching mechanisms, as well as the need to weigh alternatives in deciding whether to provide online searching to those who may not be able to pay its full cost.

Jones, Beverly A. Performance Measures in Rhode Island Libraries. Providence: Rhode Island Department of State Library Sevices, 1978.

The author presents the results of a 1977 library performance survey conducted in a number of Rhode Island public libraries using the Altman/DeProspo manual (A Data Gathering and Instructional Manual for Performance Measures in Public Libraries). The Rhode Island State Department of Library services was active in encouraging libraries to participate and in coordinating the efforts involved.

Participating libraries felt that the survey took longer than expected, and that modification was needed for its use in smaller libraries. Generally, interpretation of analyzed survey data led to some changes in the provision of library services and/or insights into actual usage, e.g., staff utilization ratios revealed that increased staffing would be beneficial at one site during the lunch hour, and in-house (non-circulated) materials usage provided actual hard statistics on an aspect of library usage that had apparently not been measured in the participating sites. The author's statement: "the overall value of the survey to individual libraries, regions and the state is limited to the extent the findings are actually used for planning" (p. 12), is particularly apt; one site indicated that it would use comments received in the materials availability section of the survey as a guide to future acquisitions.

Jones, Dennis, et al. Development and Demonstration of a Statistical Data Base for Library and Network Planning and Evaluation. Third Quarterly Report. Boulder, Colorado: Western Interstate Commission for Higher Education, National Center for Higher Education Management Systems, 1977.

This short paper is the third quarterly (progress) report on a project that was sponsored by the U.S. Department of Education and a number of western states "to develope and demonstrate a statistical data base system for library decision makers" (p. 1). By structuring the collection of library management information and standardizing definitions, the authors hope to improve the "comparability and compatibility" of library management information from various sources (p. 1).

This paper is relevant to our study in that it mentions the efforts of project staff to "isolate outcomes of library service and determine relevant measures of those outcomes" (p. 3) as early as 1977, distinguishing between library activities and outcomes of these activities (p. 5). A list of library activity measures is included as Appendix C.

Although a list of outcome (or performance) measures is not included, and collection measures appeared to be considered separately from performance measures, a discussion of the "attributes" of a library's collection as a resource is included that does cover materials availability and acessibility.

This paper presents a limited but important discussion of a larger study touching on library performance measures in an early stage of their development envisioned as relevant to academic as well as public libraries.

Kemp, Elaine, et al. "A Comparison of OCLC, RLG/RLIN, and WLN." Journal of Library Automation 14(3): 215-230 (September 1981).

A useful compendium of facts about OCLC, RLIN, and WLN. The authors take a look at each of these utilities in terms of library functions as a whole (rather than just shared cataloging), discussing both operating and planned utility subsystems. Unfortunately, when compared to other articles on the major bibliographic utilities written during about the same time period, the authors decline to investigate UTLAS, University of Toronto's bibliographic utility. Like the other papers on bibliographic utilities, however, this paper suffers from the same drawback: lack of currentness regarding planned subsystems and other services that may now be operational.

Knightly, John J. "Overcoming the Criterion Problem in The Evaluation of Library Performance." Special Libraries 70(4): 73-178 (April 1979).

A study of measurement criteria used by libraries as shown in their annual reports, Knightly's article attempts "...to offer a framework for viewing library performance criteria, to introduce data on criteria in wide usage, and to provide guidelines to library managers for selecting more appropriate criteria for the evaluation of their own organizations" (p. 173). The author provides an excellent overview of library performance evaluation and measurement criteria, and goes on to provide an analysis of measurement criteria by class of evaluation in use in the libraries studied. Knightly recommends that library managers use additional measurement criteria and go beyond the rudimentary when using quantifiable measures. He also suggests a focus on library outputs rather than processes as an evaluation class. Recommended reading.

"Learning How Innovation Spreads." MOSAIC 11(1): 17-22 (January-February 1980).

This article discusses the changes in diffusion research over the last forty years. The classical diffusion model is criticized for its inapplicability to other than well-defined innovations adopted primarily by individuals rather than organizations. The different perspectives held and terminology used by researchers in the variety of disciplines interested in the diffusion of innovation are described. The main thrust of this paper, however, is a description of yet another focus in "diffusion research": the study of the "diffuser" rather than the "diffusee" -- the role of the entrepreneur/source of the innovation in making it both geographically and economically accessible (marketing) as opposed to emphasis on adoption and utilization (consumer behavior).

Louis, Karen Seashore. "Dissemination Systems: Some Lessons from Programs of the Past." In: Knowledge Utilization Systems in Education: Dissemination, Technical Assistance, Networking. Edited by William J. Paisley and Matilda Butler. Beverly Hills: Sage Publications, 1983, pp. 65-88.

Louis' discussion centers on the results and implications of two federally-sponsored projects that dealt with the use of information by educational practitioners in introducing change in school practice. These two projects, the Pilot State Dissemination Program (PSDP) and the Research and

Development Utilization (RDU) program, are investigated with particular attention placed upon dissemination strategies, the role of linking agents and technical assistance, and the relationship of project objectives and services to the existing configuration of educational organizations on a variety of levels. Similarities and differences in both the aims and results of the two programs are covered.

In terms of our own study to investigate the diffusion of innovation in library and information science, one section of Louis' chapter is particularly relevant: pages 78 through 83 cover "lessons from the programs: information assistance". The author concludes that information "packages" had a limited value to educational practitioners and the relevance (in terms of precision, "action implications", and triability of changes and curricula described) were far more important than both quality control and turn around time in the contribution of the information to educational change. The author astutely observes: "Knowledge use does not necessarily imply change" (p. 81), perhaps her most important point.

Lynch, Mary Jo. "Measurement of Public Library Activity: The Search for Practical Methods." Wilson Library Bulletin 57(5): 388-393 (January 1983).

Lynch's article discusses the public library community's concern with measuring public library activity and the evolution of this concern into standardized methods of measurement for practical application. Library activity measures may be regarded as an innovation in that previous research and traditional library statistics had, in the past, focussed on measures that described the ogranizational parameters of libraries (size, budget, etc.) rather than investigating the possibilities for measuring information services. This new focus or "approach to collecting data about a public library " (p. 389) first showed up about ten years ago in Performance Measures for Public Libraries, published by ALA in 1973. Since the study that led the publication of this book was not completed and the corresponding data collection was not published until three years later, this may be why there is little evidence of adoption of performance measures in the literature of that period. From the point of view of diffusion of innovation, it is interesting (and important) to note that the idea did not sink into total obscurity: some years later the Public Library Association (PLA) returned to the notion of performance measures in A Plannning Process for Public Libraries (1980) and quickly decided to sponsor the development of a practical guide for employing output measures, Output Measures for Public Libraries (1982).

Matthews, Joseph. "Understanding the Utilities." American Libraries 11(5): 262,264 (May 1980).

This short article is the slightly edited introduction of Matthews' paper in the November-December 1979 Library Technology Reports, "The Four Online Bibliographic Utilities: A Comparison." Matthews defines bibliographic utility" "...as an organization that maintains a large online bibliographic data base and provides to its customer libraries products and services (both on and off line) using that data base" (p.262), and goes on to discuss the environment and factors involved in early growth and development of bibliographic utilities.

Mavor, Anne, et al. The Role of Public Libraries in Adult Independent Learning. Part II. Final Report. New York: College Entrance Examination Board, 1976.

This item discusses nine public libraries' involvement in a project to examine their role in assisting in adult independent learning via Learners' Advisory Services. Data collection areas, forms and aggregate results are treated as well as learners' and advisors' evaluation and satisfaction with the service. How the results could aid in library policy formulation is also covered. The authors identify various outcomes of the study including, identification of background with designing, modelling, and implementing new service concepts; the decision to formulate a Consortium for Public Library Innovation; and the conditions which must be met for Learners' Advisory Services to succeed in a given library.

The reader noticed that the above title and another item by the same authors, (Non-Traditional Study, The Public Library Approach: Research Study Group for the Development of an Integrated Common Data System. Final Report. New York: College Entrance Examination Board, 1976) are virtually identical. Hence, the preceding description applies to both publications.

McClure, C. and Reifsynder, Betsy. "Performance Measures for Corporate Information Centers." Special Libraries 75(3): 193-204 (July 1984).

McClure and Reifsnyder review developments in the use of performance measures in libraries. The authors examine previous work done in this field, discussing performance measures developed for use in libraries, especially public libraries, in light of their relevance to evaluating the performance of corporate information centers. Kinds of measures and data collection needs and methods are clearly described, making this article particularly useful to those special librarians who may be interested in actually designing and using performance measures to evaluate their corporate information centers rather than just investigating them. Recommended reading.

Parker, Edwin B. Forecast Use of Telecommunication Technology in 1985. Stanford, California: Stanford University, California Institute for Communication Research, 1971.

Parker attempts to look back on the use of telecommunications from the year 1985. In a light-hearted view, he begins with television as a possible medium that has become part of "the information utility" via the addition of "computers and satellites". The author also discusses the decentralization of cable TV via the provision of many channels off regionalized trunk channels and the development of video cassette libraries.

Unfortunately, because it was published in 1971 and the author did not foresee developments reducing computer size and cost while maximizing storage capabilities, videodiscs and other technological innovations, this article is limited in that it presents a view of the future in which telecommunications links interactive cable television networks.

Patrick, Ruth J.; Casey, Joseph; and Novalis, Carol M. A Study of Library Cooperative Networks and Demonstration Projects. Volume I: Findings and Recommendations. New York: K.G. Saur, 1980.

This monograph is the first of two volumes reporting the results of a U.S. Department of Education contract "to evaluate the impact and effectiveness" (p. xi) of its HEA II-B and LSCA III programs. The study was completed in 1978, covering HEA II-B for the years 1971 through 1976 and LSCA III for 1976 in terms of data collection.

Volume I of the report is divided into three parts: 1) introduction, change model for library development, and study methodology; 2) HEA II-B library research and demonstration program: an analysis of program impact, operations, and policy; and 3) LSCA III: an analysis of program impact, operations, and policy.

Although much of this volume (as well as the case studies in Volume II) may be relevant to our study of the diffusion of innovation in library and information science, this reviewer examined only the executive summary and the first two chapters in any detail. For our study, this portion of the report is especially pertinent in that it discusses the differences and similarities in scope and purpose of HEA II-B and LSCA III and uses survey data collected to answer the question: "how was this money actually used as opposed to that for which it could (and perhaps should) have been used?" Comparing the two federal grant programs, we see that HEA II-B is designed as "seed money" for library research and development, and thus has a direct impact on innovation in this field. LSCA III, on the other hand, is designed to promote interlibrary cooperation and networking. The authors go on to examine these two programs in terms of a three stage change model for library development. Stage one is "innovation/knowledge building", stage two "testing capacity building", and stage three the "operating" stage (p. 10). Both the change model and the ensuing analysis are useful to our study. The change model can perhaps be used to track the stages of diffusion of innovations and the analysis suggests that an overly large proportion of LSCA III funds were devoted to operation as opposed to testing, and with the indication that perhaps stages one (knowledge building) and two (testing) are neglected.

Recommended reading.

Plotnik, Arthur. "RLIN, OCLC, WLN, and UTLAS." American Libraries 11(5): 273-277 (May 1980).

Four separate, succinct glimpses at RLIN, OCLC, WLN, and UTLAS, respectively that make for easy comparison/contrast. Plotnik goes beyond the facile citing of number of users by type of library, discussing management, unusual features, and cooperative ventures. Useful reading.

Powell, Ronald R. The Application of Performance Measures in a Sample of Illinois Public Libraries. Urbana, Illinois: Illinois University, Library Research Center, 1976.

Powell's report is a lengthly, detailed discussion of a study sponsored by the Illinois State Library with LSCA funds to test the 1970 Rutgers-developed performance measures manual in a sample of Illinois public libraries. In addition to testing the performance manual, project objectives included: a) teaching a sample of participating libraries' personnel the data collection techniques, b) assisting participating libraries in data analysis, and c) providing each participating library with a profile presenting its scores on the major performance measures along with corresponding scores for other participating libraries in the same budget category.

The study aimed at testing the Rutgus measures in a representative sample of Illinios public libraries; a random sample was initially chosen that was stratified by both geographic locations and size, with operating expenditures being used to describe library size rather than population served. Due to the inclusion of interested but non-sampled libraries, and the replacement of libraries who declined to participate, the final sample size was 78 libraries with a final response rate of 85 percent.

Prior to data collection and analysis, workshops on how to use the Rutgers performance measures manual were held by the staff of Library Research Center of the University of Illinois at Urbana-Champaign, who were conducting the study for the State Library of Illinois. Participating libraries then spent approximately three days collecting the necessary data. Once tabulated, all data were returned to the Library Research Center and analyzed by computer. Data analysis and comments solicited from the respondents revealed that while most libraries found the use of the Rutgers performance measures manual to be a valuable but very time consuming exercise, more detailed instructions were needed. Modifications were suggested to make the manual more appropriate for use in small libraries and areas of difficulty were identified. "The Library Research Center staff's greatest disappointment in the performance measures manual was that it took a rather traditional approach to the evaluation of public library services" (p. 30). Comments from respondents were somewhat similar in that the need for subjective, qualitative measures was identified.

An extensive annotated bibliography on library evaluation is included at the end of this report. Although it is badly outdated, it does provide a retrospective look at the developments in methods and techniques of library evaluation prior to 1975.

Rettig, Richard. "The Federal Government and Medical Technology: Crossing Policy and Management Thresholds." Policy Sciences 11: 343-356 (1980).

Retting's article discusses the implications of the federal government's increasing role in the "approval" and management of medical technologies. Federal government involvement in this area is discussed in terms of how it affects the diffusion of medical technology innovations: policy changes that put a burden on developers of technology in order to receive market approval, the lack of coordination and the presence of often conflicting requirements due to the participation of several agencies, as well as government funding for patient cost reimbursement's adverse effect on health care cost containment.

Rogers, Everett M. Diffusion of Innovations. Third edition. New York: The Free Press, 1983.

Rogers' work, a revised edition of his 1971 book of the same title, is a major contribution to the literature on the diffusion of innovation. The author draws on an extremely thorough review of other writings in many discipines on innovations and its spread, liberally citing relevant references and case studies throughout his text. Important concepts are consistently set off in italics and fully defined, to be once again explained in the context of the whole chapter, in short but substantive chapter summaries.

Although the author does not treat the diffusion of innovation in library and information science, he does discuss the diffusion research traditions in the related fields of education and communication. In addition to the author's obvious expertise, clarity of expression and excellent organization of his book, Rogers is also one of few authors thus encountered who treats the weaknesses of diffusion research. Chapter 3, "Contributions and Criticisms of Diffusion Research", is especially important to our study in that by becoming aware of both different approaches and frequently encountered biases, we might therefore attempt to ensure that we explore a variety of ways of examining and describing innovations in library and information science and their diffusion, while guarding against pro-innovation and other biases.

Although this reader was only able to take in the highlights of this work, it is an extremely useful and thought-provoking example of background reading, let alone in its own right. Highly recommended reading.

Roose, Tina. "Online Database Searching in Smaller Public Libraries." Library Journal 108(16): 1769-1770 (September 15, 1983).

Roose discusses the presence of online searching in smaller public libraries and its impact upon them in this short, succinct article. After investigating nine public libraries north of Chicago, she found that most of them did provide online searching, but did not usually charge their patrons for this service, except perhaps for the cost beyond $20-25 per search. ERIC, Psychological Abstracts, and Magazine Index were among some of the more popular databases. Her most interesting comments, however, cover how online searching was changing the selection of library materials, especially reference collection secondary sources. Online searching was found to negate the need for certain printed indexes by virtue of its pay-as-you-go formula and greater currency. In one library, online searching of BIP proved to be an additional means of saving money when performing pre-acquisition bibliographic verification. Changes in actual practice of reference services and staff attitudes due to online searching are also discussed.

Sager, Donald J. The American Public Library. Dublin, Ohio: OCLC Office of Research, 1982.

Sager's paper represents a digest of information on public libraries. Analyzing data from several major public library studies conducted in the 1970's, including the LIBGIS surveys, Sager discusses public libraries in the U.S. in the 1970's after a brief description of their history. Logically arranged in sections, the author's work attempts to present an overview of public libraries in the 1970's that draws both on statistical survey data and on major developments in public libraries as reported in the literature. Section 14, use of newer technology, is relevant to our study of the diffusion of innovations in libraries in that Sager treats the adoption of online reference services (online bibliographic database searching) and the adoption of various forms of automation online cataloging, online circulation, etc.) in which membership in bibliographic utilities may be involved. He is one of few authors to point out that "adoption counts" of these types of innovations may actually fall short of the total, as many public libraries may be involved in cooperative ventures, or participate in much activities indirectly via services provided by their state library, referrals to other libraries, etc. Sager also makes frequent distinctions when analyzing statistics on public libraries between libraries serving variously sized population groups, and more imporantly, urban, suburban, and rural libraries. These size and location distinctions appear to be important when considering how and why innovations diffuse in public libraries.

Saidi, Khosrow. "Problems of Concept Transfer to Developing Countries." Sociologia Ruralis 21(3-4): 228-242 (1981).

The transfer of agricultural concepts from socialist countries to developing countries in light of instances of the transfer of "farm collectivization" is the subject of this paper. The problems in direct concept transfer from country to country are treated in terms of the "environmental factors in the receiving country that affect the concept's acceptance" (adoption and diffusion of an innovation). Saidi describes the need to take into account the "idealogical", "technical-personal", "geo-political", "economic" and "institutional" factors (p. 228) when considering a concept, etc. utilized in one country can be "transplanted" whether in another country successfully. In terms of planning for change, he also points out the importance of a sufficient transition period and the consequences in terms of passive and active resistance and discontinuation forced adoption can bring, even if broached in voluntary terms.

Sawyer, Stephen. "Leaders in Change: Solar Energy Owners and the Implications for Future Adoption Rates." Technological Forecasting and Social Change 21(3): 201-211 (June 1982).

Sawyers' paper reports the results of two surveys of solar energy system owners conducted by author and compares these data to data obtained in several other similar surveys. The characteristics of the homeowner respondents were studied within the context of the diffusion and adoption of innovations in order to "... anticipate future solar market penetration patterns" (p. 201), as were their motivations for installing solar energy systems and their post-installation satisfaction with the systems. Analysis revealed that this first set of "adopting" homeowners more closely matched the adopter characteristics of early adopters rather than those of innovators (p. 207). That "early adopters" are characterized "...as more integrated into [the] local social system" (p. 206), and that these "early adopter" survey respondents indicated that they were fairly satisfied with their solar energy systems, have favorable implications for the diffusion of solar systems as an innovation. On the other hand, analysis showed that economic considerations were fairly important as a motivation in the decision to install solar systems; this fact, coupled with the high income levels of survey respondents and relatively low level of awareness of income tax credits for installation of solar systems, implies that continued economic incentives and future cost reduction efforts (p. 208-209) are important if future adoption rates are to be increased.

Sparkes, Vernone M. The Users of Cable TV Access Channels: Study of the Diffusion and Adoption of a Communication Innovation. Paper presented at the 62nd Annual Meeting of the Association for Education in Journalism, Houston, Texas, August 5-8, 1979.

The author states: "the issue to which the present study is directed is that of user development; that is, the diffusion and adoption of this new technological innovation among those with public communications needs which might be served thereby" (p. 2). Sparkes then goes on to discuss "real and potential impediments to the development of cable TV use" (p. 3) or barriers to diffusion, listing awareness, psychological attitudes, understanding of the medium itself, and management and planning skills. Within the last topic, the author has investigated the role of "animators" or facilitators in the use of cable TV and found that knowledgeable personal contact was indeed important in community utilization of cable TV.

Stebelman, Scott, D. "On-line Searching and the Humanities: Relevance Resistance, and Marketing Strategies." In: National Online Meeting Proceedings - 1981. Compiled by Martha E. Williams and Thomas H. Hogan. Medford, N.J.: Learned Information, Inc., 1981, pp. 443-453.

Stebelman discusses several reasons why humanities users use online bibliographic searching less frequently than their counterparts in science and social science do. The time coverage lags in humanities databases, problems with imprecise vocabularly in the humanities, the small number of pertinent databases available, as well as philosophical and psychological discomfort with the utilization of computers to assist in humanistic research are given by the author as possible explanations for why humanities scholars do not utilize online bibliographic searching to a larger extent. Stebelman goes on to discuss the ways in which he as a librarian at the University of Nebraska library was able to overcome some of the humanists' resistance and encourage their use of online databases. Actual demonstrations of online searching outside the library in users' "home" departments on humanities-related research topics were one tactic the author used; others included a clear description of when an online search would be feasbile and when it would not be feasbile, as well as the provision of handouts explaining the advantages and disadvantages of online searching. That the library was willing to subsidize searches for humanities faculty and doctoral students in order to encourage them to familiarize themselves with online searching also surely played a part in the success of the author's "marketing" activities.

Stevens, William F. and Tornatsky, Louis. "The Dissemination of Evaluation: An Experiment." Evaluation Review 4(3): 339-354 (June 1980).

The authors state: "the perspective of the present research is that the adoption of evaluation methodology in human service organizations is both significant social problem and an important knowledge utilization and organizational change issue. This research will apply experimental methodology to a comparison of various strategies for disseminating evaluation methodology" (p. 340). Taking the apparent viewpoint that implementing innovations in organizations is a nonuniform task that can best be handled by more informal interaction types, the authors experiment by introducing the innovation of program evaluation by informal means. Following indications in the literature of organizational change on the importance of "participative decision-making" and "face-to-face interaction" with regard to the acceptance of change (p.341), Stevens and Tornatsky designed and conducted an empirical study to investigate "... the degree to which the intervention [in this instance, consultations] enhances participation among staff, and the degree to which face-to-face interaction is maximized" and to look at "... the relative impact of these two factors on the organizational adoption of an innovation" (p.343). Results of the study supported Steven's and Tornatsky's hypothesis that group consultation would produce more adoption of program evaluation techniques than private consultations, but did not indicate that on-site consultations were more effective than telephone consultations (p.339).

This paper includes a detailed explanation of the methods and processes used in introducing program evaluation as an innovation and tracing its adoption rates in different groups by the variables being examined. The results are reported and a discussion of their implications follows. That the authors voiced additional research questions raised by the analysis of their data is important; they indicate that their study did not reveal the "... specific processes involved in group participation which ... facilitate innovation adoption" and suggest that investigations into the kinds of staff involvement (form, amount, role, etc.) may be fruitful (p.349).

Streatfield, D.R. and Wilson, T.D. "Information Innovations in Social Services Departments: A Third Report on Project INISS." Journal of Documentation 38(4): 273-281 (December 1982).

Streatfield and Wilson's article treats the results of a study of innovations in the provision of information services to social service field workers in the United Kingdom. The Project found that "field-based social services staff are deprived of published information resources of all kinds" and that, in this context, interpersonal barriers to adoption of innovation were more important than organizational barriers (pp. 278-279). Factors affecting the long-term success of an innovation are also discussed, including management's role and the simplicity and ease with which an innovation could be adopted and then maintained. The information service innovations tested encompassed those dealing with book collections, journal distribution, a journal abstracting bulletin, and an information collection.

Tagliacozzo, Renata. "The Consumers of New Information Technology: A Survey of the Utilization of MEDLINE." Journal of the American Society for Information Science 26(5): 294-304 (September-October 1975).

The author states: "if one looks at information systems from the point of view of innovation, one realizes that factors other than the effectiveness of a particular technology and the appropriateness of its use play an important role in the diffusion of new systems" (p. 294). Keeping this is mind, she goes on to discuss the results of a study investigating the factors involved in deciding to utilize MEDLINE. The study was conducted several years ago in a limited geographical area and thus the results may not be generalizable to current factors involved in the adoption of MEDLINE, because the level of diffusion and adoption is currently much higher. However, the study does give us insights into the early stages of adoption of MEDLINE as an innovation, the reasons for its use, its initial user groups, and principal sources of information or "diffusers".

It would be especially interesting to compare the results of this study of MEDLINE adoption with more current information in order to investigate whether the "diffusers" as well as the users have changed both with regard to proportion and new channels of adoption/diffusion being established.

Teece, David J. "The Diffusion of an Administrative Innovation." Management Science 26(5): 464-470 (May 1980).

In a highly technical article Teece describes the diffusion of an administrative innovation in organizations, the "M-Form" organization, "...a multidivisional structure with quasi-independent divisions which are assigned profit center standing and which are monitored and guided by a headquarters organization" (abstract, p. 464). In a sample of firms in the petroleum industry and principal firms in 17 other U.S. industries, the author used a mathematical model similar to those developed to predict the diffusion of technological innovations by Mansfield. He found that the model's ability to predict the adoption rate of the M-form organization was fairly good, although better for industries other than the petroleum industry.

Trochim, Mary Kane. Academic Library Resource Sharing Through Bibliographic Utility Program Participation. Washington, D.C.: U.S. Department of Education, Office of Educational Research and Improvement, Office of Libraries and Learning Technologies, August 1982.

This document reports the results of a study conducted by Trochim for the U.S. Department of Education on how participation in bibliographic utilites affects library resource sharing, specifically, interlibrary loan. The author discusses the growth and development of bibliographic utilities and networking in general, and takes a closer look at six academic libraries who are members in either RLIN or OCLC. The six libraries all provided information on the volume of their interlibrary lending and borrowing as well as how membership in RLIN/OCLC changed their volume of interlibrary lending and borrowing. For the libraries that were distinctly net lenders, no significant increases in the volume of requests after joining a utility were noticed. However, one of the six libraries studied was previously a "net borrower," but when it joined OCLC and its holdings were available via OCLC's database, it experienced an increase in loan requests from non-local institutions.

One useful aspect of this study for our investigation of the diffusion of innovation in libraries is that the author elicited comments from the six academic libraries she investigated on how participation in bibliographic utilities effected not only resource sharing but other aspects within the library such as staffing configurations, budget allocations, and changes in the knowledges and skills needed by the staff.

Trochim, Mary Kane. Academic Library Resource Sharing through Bibliographic Utility Program Participation. Executive Summary. Washington, D.C.: U.S. Department of Education, Office of Educational Research and Improvement, Office of Libraries and Learning Technologies, August 1982.

This executive summary provides a very concise synopsis of Trochim's report, Academic Library Resource Sharing Through Bibliographic Utility Program Participation. The reader is referred to the full report, described above, for a well-written investigation of the impact of membership in bibliographic utilities (OCLC and RLIN) on academic library resource sharing (primarily, interlibrary loan) as of 1981-1982 and a look at future issues for this area.

Vance, Charles M. "Concerns About Power and Achievement Motivation in the Dissemination of Innovations." Educational Technology 20(9): 27-29 (September 1980).

The author states: "the purpose of this article is to examine current theory and empirical evidence to illuminate the role of power and achievement motivation in the success of innovation dissemination and to suggest new ways, illustrated by case studies, of utilizing hidden motive drives to assist in the adoption of change" (p. 53). Vance discusses other researchers' efforts in investigating the motivation profiles of successful managers and the attitudes toward change change agents should develop in clients. While lack of resistance and positive desire to change are indeed important in the adoption of innovation, achievement motivation also plays a role. The author calls for the use of "innovation profile diagnosis" and appropriate "motive training" (p. 56) by change agents to improve the diffusion and adoption of innovation.

Vavrek, Bernard. "A Struggle for Survival: Reference Services in the Small Public Library." Library Journal 108(10): 966-969 (May 15,1983).

A unique and unusual article discussing problems in providing reference services in small, rural public libraries. Lack of adequately trained staff, insufficient general collection size and lack of specialized materials, as well as geographic isolation tended to be major contributing factors in the difficulties these libraries faced. Data were gathered by means of a telephone survey of a small number of rural libraries in Pennsylvania by the Center for the Study of Rural Librarianship at the School of Library Science, Clarion State College. Data gathered showed that the population served tended to be twice as large as the actual census population of the locality in which the library was located, with those areas served further straining the library's budget by providing little or no support (p. 966). As part of the survey, librarians were asked about activities they considered to be a part of providing reference services. The responses to this question indicated some diversity, but also a general conservative approach to the components of reference service (p. 969). Whether or not this conservative attitude can be explained by the constraints placed on the libraries and a conscious limitation of service because of these constraints and/or because of the librarians' lack of academic training does not appear to have been explored.

Venett, Anthony J. "Technology Transfer for Industry and Business Through the University Library." Special Libraries 72(1): 44-50 (January 1981).

An interesting paper that describes the Library Information System Project at the Pennsylvania University Library. Under the auspices of PENNTAP, the Pennsylvania Technical Assistance Program, the University Library submitted a proposal and won funds made available by the State Technical Service Act of 1965 to provide technical information to industry in the state of Pennsylvania. The act's major purpose was to support information transfer to industry.

Begun in 1966, the PENNTAP Library Information System modeled itself on agricultural extension services of the past in attempting to supply answers to practical requests of a technical nature, rather than supplying research-oriented information services. A brief but thorough description of difficulties and changes in the program is provided, as well as a discussion of the ways in which technical services were provided using resources other than the University library. The author ends with a justification of support for such information transfer programs that is compelling in understandable cost-benefit terminology.

Webster, James and Warden, Carolyn. "Comparing the Bibliographic Utilities for Special Librarians." Special Libraries 71(12): 519-522 (December 1980).

Much like Plotnik's paper (discussed above), this paper compares and contrasts RLIN, OCLC, WLN, and UTLAS. However, Webster and Warden base their information on data gathered via an SLA survey of the utilities and SLA interviews with utility representatives. They, unlike Plotnik, discuss terminal and telecommunications specifications and costs and services provided. This paper treats the current (at the time of publication) status, etc., of the utilities and is specifically geared to the interests of special librarians.

White, Phillip. Online Retrieval Systems Users Survey from Texas. Texas, 1981.

White reports the results of a survey of 160 Texas institutions of higher education. Public and private two-year colleges, four-year colleges, graduate and professional schools, universities, technical institutes, and theological seminaries were included in this study of the availability of online searching (DIALOG, BRS, and SDC) in academic libraries. While nearly one-quarter of all of the responding institutions had access to at least one of the three bibliographic retrieval systems, only 14 percent of the private institutions offered online searching on these systems, as opposed to 30 percent of the public institutions. Availability of online searching on these three systems also differed by kind of institution: only eleven percent of the two-year colleges responding offered online searching and all of these institutions were publicly supported. Not surprisingly, universities with graduate programs showed the highest "adoption" (in 1981) of online searching via BRS, DIALOG or ORBIT — 57 percent provided online searching in their libraries. Many institutions had access to more than one system, and none of the responding institutions used ORBIT exclusively. Responding institutions were asked their primary reason for using a particular system when they had access to more than one system. Responses were quite revealing: DIALOG users preferred it because they were familiar with it; BRS because it was the least costly system to use; and ORBIT because it offered access to databases not available via other systems.

Williams, Gordon R. "The Function and Methods of Libraries in the Diffusion of Knowledge." Library Quarterly 50(1): 58-75 (January 1980).

Treats the historical role of libraries, especially university libraries, as storehouses and diffusers of knowledge. Does not discuss the diffusion or adoption of innovation, but, on the other hand, reminds us of the finite nature of libraries (library size, library budget, etc.) vs. the infinite nature of knowledge.

Williams, P.W. "A New Device to Simplify Online Searching and Reduce Costs." In: National Online Meeting Proceedings - 1981. Compiled by Martha E. Williams and Thomas H. Hogan. Medford, N.J.: Learned Information, Inc., 1981, pp. 503-514.

Williams reports on efforts to use microcomputers to simplify online searching and reduce costs. The capabilities and associated costs of three levels of "enhancement facilities": small microcomputer systems, medium microcomputer systems, and large scale facilities are discussed (p. 508). Williams' own USERKIT search aid, developed as a purpose-built small microcomputer with "... programs permanently written into read-only-memory" (p. 510) and available in the UK for approximately $2000, is described within the context of search enhancement facilities. The capabilities of USERKIT are examined, as are its operation and the reactions of its users.

Wilson, T.D. and Streatfield, D.R. "Information Needs in Local Authority Social Services Departments: An Interim Report on Project INISS." Journal of Documentation 33(4): 277-293 (December 1977).

The authors discuss the initial work done on Project INISS, a study to investigate the information needs of social service workers in the United Kingdom. Using the "action research" framework, which feeds systematically collected data about a system back into that system by changing it (altering system variables) and evaluating these changes, the authors state: "the action research collection mode establishes at the outset of the research the idea that the data collection and analysis phases should result in ideas leading to testable innovations in information service organization and information system delivery" (p. 278). The authors investigated information behavior as part of total organizational bahavior, not separating information needs from the major occupational duties of the social service workers. Thus, the project was always grounded in the day-to-day practical realities of the social service worker and their information needs were seen in this context. The case study approach was used in Project INISS and this paper reports on the structured observation phase of the study that sought to determine "the contribution of information use to the working life of the target group under study" (p. 279). It was found that the bulk of social service workers' "information-transfer encounters" were five minutes or less in length and that they depended heavily upon oral rather than written forms of communication for the exchange of information. Additional data regarding the "information behavior" of social service workers can be found in the text of this paper.

Wilson, T.D.; Streatfield, D.R.; and Mullings, C. "Information Needs in Local Authority Social Services Departments: A Second Report on Project INISS." Journal of Documentation 35(2): 120-136 (June 1979).

This is the second of three papers published in Journal of Documentation covering Project INISS, a study to determine the information needs of social service workers in the United Kingdom. The authors report on the interviews conducted to verify the conclusions drawn during the observation phase regarding information behavior and its relationship to individual and organizational characteristics (p. 120). Data were collected on the respondents' work roles, contacts, experience and training, etc. in addition to their information behavior in order to test hypotheses. The results were then analyzed and are excerpted and categorized by the authors into the following areas: "context of information needs, organizational communication, and information need and information-seeking behaviour" (p. 125). The authors then conclude that information services and organizational communication practices must not be viewed as separate, suggesting improvements in information services broken down by different work roles for social service departments based upon the results of this study.

Wood, R. Kent and Woolley, Robert. An Overview of Videodisc Technology and Some Potential Applications in the Library, Information, and Instructional Sciences. Syracuse, New York: ERIC Clearinghouse on Information Resources, 1980.

This paper discusses the potential applications and likely development of videodisc technology for information services and instruction. The authors treat the similarities and differences in the four different types of videodiscs and their suitability for other-than-entertainment purposes. The authors point out the need for a combination of patience and healthy skepticism before adopting this new medium, as it is still undergoing change and was initially developed for purposes that place different kinds of demands upon it than those of storing information and providing instruction.

Too, the authors discuss how information and instruction professionals can play a part in the diffusion of this innovation. They stress a systematic approach to the design, use and evaluation of videodisc technology within an awareness of its limits/capabilities and likely impact. After describing various early projects using videodisc technology, they summarize the published literature. (This summary is, unfortunately, outdated as it covers through 1980 only.) Finally, the authors outline fault tree analysis ("...a technique for increasing the probability of success in any system or organization by analyzing the most likely modes of failure that could occur" (p. 24) as a means for assisting the diffusion process of this innovation in information and instructional settings.

Young, Donna. A Field Test of Two Tools Designed to Link Knowledge with Needs of Knowledge Users. Paper presented at the Annual Meeting of the American Educational Research Association, Los Angeles, California, April 1981.

Young's paper discusses the use of Wolfe's Welsh Linkage Methodology (WWLM) and his Knowledge Diffusion Utilization Inventory (WKDUI) in a Women's Educational Equity Act sponsored project, project NEED. Project NEED was concerned with directing, demonstrating and documenting educational equity. Wolfe's methodologies covering educational change and innovation were employed because they represented a practical means of documenting and evaluating linkage activities and conditions for change in educational institutions.

This reviewer had no small difficulty in understanding the thrust of this paper and the results of using WWLM and WKDUI in project NEED. However, the reader is referred to the paper's appendix, which appears to represent the two "Wolfe" data collection instruments. These instruments are easier to comprehend than the rest of the text and are interesting in that they view linkage and its role on the adoption of innovation as almost purely a communication activity. Stages of the diffusion of innovation are shown within this context of the complexity of the necessary communication.

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APPENDIX C

CASE STUDIES

CASE STUDY 1

BIBLIOGRAPHIC UTILITY — EARLY ADOPTER

1. Adoption Date and Classification

September 1971: Early adopter.

2. Adoption Process

Awareness-interest rapid

- Commitment by leadership/catalogers followed
- Integration eased by participation in development
- System works better now, less down time but less collaboration too
- Seriously considering moving to more localized system and network [local task force] using DRA (Data Research Associates)
- OCLC not as user-friendly.

3. Adaptations

None yet, except moved with OCLC development.

4. Barriers

Initially:

- lack of instructions, poor manuals (big, complicated)
- (Undeveloped status of technology)

5. Facilitators

Charismatic extrepreneurial outsider.

- proximity (to Ohio institutions collaboration on development)
- networking approach
- collaborative-dialog approach.

6. Level and Extent of Use

11/11
18/24

7. Use Configuration

They use 6 functions of OCLC and make no adaptations. Enthusiasm with catalogers seems to be declining somewhat although they are clearly skilled and run the system smoothly at this point.

8. Benefits

- using other resources
- some cost savings
- more aware of doing a good job
- catalog standards better
- we do much less original cataloging.

9. Costs

$375/yearly membership in Ohio Net.
- some fear of terminals/terminal fatigue
- cards not as easy to read (user cost)
- significant down times when system was in transition.

10. Subjective Benefit-Cost Ratio

3:2

11. Continuation/Routinization

Fully integrated but ready to replace it with another. This decision will be thought through rather carefully and this is happening now.

7/7

12. Secondary Diffusion

1980: Trained law school librarians in OCLC.

1981-1982: Persuaded local community college to expand use of their OCLC from searching only to cataloging.

1984: This library is an active member of an informal local library network which is currently considering developing its own automated bibliographic system. "We are all set to do it; this is the time but we are still fence sitting."

13. Other Relevant Information

Case seems to illustrate effects of OCLC expansion. As it gets larger, members perceive:

a. less dialog
b. less control/influence over decisions
c. less sensitivity to local needs.

CASE STUDY 2
ONLINE SEARCHING — MID-ADOPTER

1. Adoption Date and Classification

1978: middle adopter.

2. Adoption Process

Awareness not traceable - began much earlier than 1979. Already being done in engineering department (but high dollar). Consortium set up of 15 libraries to access BRS cheaply (mostly medical).

Grant from the graduate school ($7,000). Policy that everybody does everything therefore everybody in reference department eventually trained.

3. Adaptations

Truly interactive now; person must be present. Took 2 years to develop form.

4. Barriers

None evident; "nothing stood in the way."

5. Facilitators

Young innovative middle level insider sparked it.

- Dean of Grad school had science background, impressed informant.
- Library director supportive of new ideas, initiative.
- No red tape.
- University always in black.
- 1,500 searches/year.

6. Level and Extent of Use

11/11

16/6

7. Use Configuration

80% BRS, 20% DIALOG (both BRS and DIALOG acquired at the same time, plus 3 other vendors little used).

- BRS said to be 1/2 cost but missing some facilities.
- Truly interactive: next day appointments to sit by the searcher. Manual search required first.
- No fees for insiders.

Users:

- 60% Grad students
- 20% Faculty
- 17% Undergraduates
- 3% Business/outsiders (for fee).

8. Benefits

Accomplishes a lot of very sophisticated reference work for users

- Librarians get professional growth, job mobility
- High morale from being technological leaders is evident.

9. Costs

Over absorption in the technology (by 2 staff)

- Did drop some individualized reference work
- Do not produce bibliographies for course any more.

10. **Subjective Benefit-Cost Ratio**

5:5

11. **Continuation/Routinization**

6/7

12. **Secondary Diffusion**

Staff trained in OLS appear to have high mobility to jobs elsewhere where these skills are at a premium (e.g., at a nearby Air Force Base).

Also train users in home searching.

13. **Other Relevant Information**

The service is perceived internally as highly successful, and it has grown rapidly since first adoption. Grant allowed staff to be creative in both marketing and service configuration development. System is truly interactive. Also may illustrate advantages of middle adoption: technology is up-and-running; bugs are out; can pick and choose databases and vendors for user needs and cost efficiency.

CASE STUDY 3

OUTPUT PERFORMANCE MEASURES — NON-ADOPTER

1. Adoption Date and Classification

Essentially a non-adopter, not aware of ALA guidelines.

2. Adoption Process

First discussions loosely on this topic in 1975 with library committee.

- Survey form developed by Assistant Library Director 1981-1982.
- Directs a "library automation project".
- No pressure from library director or University vice president on OPM issue.
- Understaffed; not much time to analyze masses of data from computer output.
- As of 1981, policy is to present data every 5 years to evaluate each department collection.
- Hard to get academic departments to help.
- Still developing ways of using, interpreting data (only one person works on this, part time).

3. Adaptations

(N/A) Still being developed (but not really an OPM system).

4. Barriers

No push for it; not linked to other libraries who are trying it; faculty and administrative indifference.

Lack of staff resources committed to it.

5. Facilitators

Good environment for innovation but not activated on this issue.

6. Level and Extent of Use

0/11
12/66

7. Use Configuration

A lot of effort goes into tabulations on computer of circulation, visits, reference transactions and holdings.

Some of these measures are compiled annually, inserted in annual reports. These are sometimes used to justify and change departmental library budgets but not to develop library policy.

Comparisons are not made with other libraries.

8. Benefits

Helps departments know what they have and need; builds confidence in us; settles arguments.

9. Costs

By-product of circulation system, therefore not too expensive/10% of time of assistant director.

10. Subjective Benefit-Cost Ratio

4:5

11. Continuation/Routinization

Not clear what will happen with this effort in the opinion of the site visitor.

4/7

12. Secondary Diffusion

None.

13. Other Relevant Information

Pressure for OPM internally is low; awareness of alternative models of OPM is low; interest and resources are moderate.

Result: Weak measures and a lot of wasted effort; large quantities of unanalyzed data.

CASE STUDY 4
BIBLIOGRAPHIC UTILITY — MID-ADOPTER

1. Adoption Date and Classification

First card produced in May 1981 (decision to adopt 1979) middle adopter.

2. Adoption Process

Circa 1974: Somebody contacted new library director, re OCLC

- He asked head of cataloging to go with him to visit OCLC site.
- Head of cataloging had negative reactions to OCLC and whole idea of BU.
- Nothing more happened.

1976: New library administration, created position of assistant director. Assistant director position filled.

- The next year was a dynamite one with new staff & more staff.
- "People began to come out of their departments and talk."

Late 1977: Assistant director established working committees for more formal talk. There was one with 10 people to investigate the applications of automation.

1978-79: Report Preparation Committee considered innovations for acquisitions and circulation, along with OCLC, RLIN, and online searching. Online search spun off in its own report and implemented by late 1979 (see that profile).

- Head cataloger ill much of this time. Department leaderless. Head cataloger finally resigned.

Jan-Feb. 1980: Report completed. It listed priorities for automation:

- Cataloging (OCLC over RLIN); Circulation (head Negative); Acquisitions (less developed).
- Prior to presenting report to university administration, new head cataloger was hired who had prior experience with OCLC implementation. Head cataloger reviewed the report and made some changes (e.g., not promising staff reduction but staff remanagement).
- Report presented to university administration. They said go ahead with OCLC.

Rest of 1980: Preparations for implementation (ordering equipment training, etc.).

May 1981: First card produced.

3. Adaptations

- have added more terminals; are now adding additional not dedicated
- merged OLS budgets of cataloging & OLS into line item for on-line services
- are joining RLIN as well
- adding OCLC/ILL
- searching BRS through MLC-SUNY/OCLC Affiliated Services
- because of head cataloger's experience, are now asking political questions.

4. Barriers

General: Physical arrangement of library has staff in separate compartment.

- much turf concern (competition)

Awareness: Head cataloger negative reference BU; stopped further consideration.

Adoption: Head cataloger sick all but total of 6 months in 2 years - department leaderless (this is actually a facilitator because it allowed others to move ahead on OCLC).

- money was a consideration
- not much encouragement from the university
- some resistance from staff; they didn't know how it would affect them.

Implementation: Some OCLC connected problems (system shut downs, etc., some local problems.)

5. Facilitators

Change of library administrator, especially the creation of assistant director position.

Assistant director wanted to solve circulation problems (big backlog of books at the end of every semester), was predisposed towards automation so cataloging became top priority instead.

Library's self-study said to the university administration that the library "stank" - didn't sit well with them, so they were willing to consider changes.

"No one was happy with the old (cataloging) way - it was not a choice" (library had a backlog of 20,000 books to be cataloged).

Regarding the choice of OCLC over RLIN: OCLC was proven. This is a private university with a small endowment. It is not in a position to be a groundbreaker. For the university administration, the library could point to pages of OCLC participation. OCLC had more users and more subsystems. "Intellectually RLIN has it over OCLC because of the authority file. But RLIN was limited to research libraries and was the new kid on the block."

A new cataloger was hired. He wanted to come because the library was going to implement OCLC. He had previously worked at two OCLC-using libraries, including one where OCLC was implemented while he was there. "I came in with the right attitude."

6. Level and Extent of Use

11/11

14/24

7. Use Configuration

Have 4 dedicated terminals, 20 FTEs. They are getting 2 additional M300s that are multipurpose. They do search only for acquisitions and ILL, but are adding ILL subsystems. They use OCLC for all cataloging but periodicals and Asian language materials. They have not yet done retrospective conversion. They use it for some authority control and some serials control, and for serials union list (current project).

The line item for all online services is $66,500 (incudes OLS), reviewed annually.

8. Benefits

- uniformity of standards of cataloging.
- resource sharing through ILL
- for serials, you get much more exact information
- has improved reference services tremendously, but don't know if users care. Can find things much more easily and quickly.

9. Costs

None (it is expensive).

10. Subjective Benefit-Cost Ratio

4:5

11. Continuation/Routinization

7/7

12. Secondary Diffusion

Law Library has just adopted OCLC - nominally reports to the main library but is essentially autonomous. One branch of the main library already has OCLC-ILL, which the main library is just now getting. (When did it get OCLC?)

13. Other Relevant Information

Highlights:

- The study and planning of automation by this library staff seems striking.
- The considerable OCLC experience of the new head cataloger makes him more sophisticated about implementation of OCLC than those who have gone through it only once.

CASE STUDY 7

BIBLIOGRAPHIC UTILITY — LATE ADOPTER

1. Adoption Date and Classification

The law library began cataloging in April 1984; decision to adopt came in Spring 1983, making them late adopters of OCLC.

2. Adoption Process

Awareness: Cataloger and library head had read articles about OCLC. The main library adopted OCLC (the law library is nominally under the main library but is a separate entity as required by law school standards).

Choice/Adoption: They requested materials from OCLC. The catalogers did not look at RLIN or others, although maybe the library head did. The cataloger was interested in increasing efficiency on card production and tapping into information about "what's out there." The library budget was the main inhibitor; they just had to juggle the budget. The head of the library sent proposals to both the law school administration and the university administration at the same time. The vice president in the university administration is in favor of computers so he had a positive attitude. The law school administration saw that the main library had OCLC; it felt its library should have it, too - a matter of prestige. Initial startup cost was $6,000 for terminal and membership.

There was no cataloging backlog; in fact, the catalogers were always waiting for the books to arrive with cards made up, so there is not a hint of a pressing problem to be solved.

Early Implementation: The cataloger went to Albany for training and began card production in April 1984. He is at this point working the bugs out of the process and learning to get the most out of the system. He and his co-workers do all the preliminary work, then spend one day per week actually producing on the terminal, which they operate either very early in the day or late in the evening. They have had no big problems, although learning to use a keyboard and understanding that "the machine does exactly what it is told to" has taken a while to become accustomed to. They give the reference department three hours per day for ILL. The cataloger is certainly a good example of someone at the "mechanical use" stage of implementing an innovation. Although things are going smoothly, he is focused on learning what the machine can do, sorting out his relationship with it, etc. He talked about searching for a month for a missing period, about heavy fingers on the keyboard, about swearing at the terminal, and so on. It is clear that he and his partner really like the machine challenge, however.

3. Adaptations

The reference department got OCLC ILL in July 1984. Otherwise, nothing.

4. Barriers

None.

5. Facilitators

The main library had it - the law school administration felt its library should have it, too - prestige. And the law school administration saw what OCLC could do.

The way the law library head presented the proposal to the law school administration and the university administration, the case for OCLC was well documented.

Law library is a small operation.

The law school is a money-maker for the university. If it needs something, it gets it.

6. Level and Extent of Use

11/11
11/24

7. Use Configuration

This library is just starting out.

8. Benefits

Increased material getting out on the shelves quickly.

Increased bibliographic knowledge of what's out there.

The monthly list of acquisitions the catalog typed up now comes directly from OCLC - copied and distributed to faculty.

Improved subject headings.

A search will occasionally bring up titles that are not available, which the library can buy or acquire through ILL. Useful for faculty.

9. Costs

None, although "the screen does a job on your eyes." Cataloger was initially afraid of the machine up in Albany. Now he loves it.

10. Subjective Benefit-Cost Ratio

4:3; the latter rating is because the cataloger felt that telephone costs would increase, making OCLC more expensive to use. (He could only think of literal costs.)

11. Continuation/Routinization

6/7

12. Secondary Diffusion

The main library has come to visit to look at the IBM workstation. The law library cataloger went to see OCLC at the Main library prior to that. He is trying to "sell" OCLC to the woman who does the billing to get her to use the terminal.

CASE STUDY 11

ONLINE SEARCHING — EARLY ADOPTER

1. Adoption Date and Classification

1971-72, this library was one of the pilot sites for the NLM experiment that became Medline, making it an early adopter.

2. Adoption Process

Awareness/Adoption: The National Library of Medicine called the health sciences librarian located at the hospital (the library had a main building as well) and asked her to be a part of the pilot test. There was a 2-3 page document prepared, a letter of agreement, but there were no costs involved initially so there was no problem. The university medical school in general supports things that come.

Early Implementation: The health sciences librarian was trained, the searching was done at the hospital, AIM/TWX. By 1972-73, the person was leaving and a new person (now the director of the library) was trained. The system had gone beyond AIM/TWX to Medline. The new person searched on a 120-baud terminal and taught people to use it themselves. In May 1973, the library moved to a new building from a civil war vintage main building and other dispersed quarters that made searching difficult. Computer searching was featured on opening day. Three librarians are now searching; equipment was upgraded when the library bought a 300-baud terminal.

3. Adaptations

Later Implementation/Adaptations: In 1975-76, NLM began charging online costs. The director then went to the medical school administration, got funding for library to continue free searches. The first year the connect costs were $2,000; in 1983, the connect costs were $20,000 with a 1200-baud terminal just for Medline.

In 1980, the first 1200-baud terminal was purchased; in 1982, another was added. This equipment changed the number of citations and the balance between online and offline printing. With the 300-baud terminal, searchers printed offline more, and had a limit of 25 citations printed online. With the faster machines, they would print 100 or more citations online in the same time; indeed, they tended to print online in general because it saved staff time in processing searches. The use of the faster printer and other techniques for getting a lot out of the machine caused NLM and other vendors to think that this library and presumably other fast equipment-owning libraries were "downloading." Now NLM and other vendors charge by the character rather than by connect time, a new charge algorithm that was instituted around June 1983. This was to equalize the burden between slow and high speed equipment owners. Understandably, this change has affected the number of citations allowed and the offline/online balance once again.

As of July 1984, the library has had to charge even for Medline searches (see #7 below).

4. Barriers

Really very few, and all early in the process.

The director of the library in 1971 was afraid of computers, so there was no initiative being taken in that direction.

Before the library moved into a one building, searching was done in a separate location from the main facility or the hospital.

5. Facilitators

A young, enthusiastic librarian at the hospital, eager to take on OLS.

NLM funding of the pilot project meant no costs were incurred by the school, which as a private school could not have undertaken the venture so easily otherwise.

This school generally supports things that come from NLM.

The benefits of OLS for medical use were readily apparent—"like penicillin".

The second searcher and current director has a background in education. Thinks of promoting OLS as a tool.

The director of library in the mid '70s supported acquisition of terminal after NLM project ended; also was supportive of absorbing costs when NLM began charging for connect time.

6. Level and Extent of Use

11/11
11/16

7. Use Configuration

For the last two years they have charged for non-Medline searching; now all searching will be charged. In July 1984, the library instituted additional charges for OLS, with a fee structure for different clients: $3 for students; $6 for faculty. Non-medical center users are charged minimum of $10; outsiders are charged $35/hour to talk plus direct cost.

Before about 2 years ago, Medline was searched 60% of the time; BRS, 30%; and DIALOG, 10%. They once had SDC but dropped it. Now the adjacency feature of BRS not needed, so the use configuration looks like this: Medline (NLM) = 90%; BRS =8%; DIALOG = 2%. The OLS staff said searchers were more familiar with BRS and had a feeling that it is less expensive than DIALOG.

In 1983-84, the library did 2,314 Medline searches; 198 other NLM; and 293 other online databases for a total of 2,805. The OLS staff told me that they had done 5,173 during the same period, so that must include ready reference, ILL verification, SDI, and retrospective searches, which are not included in the first figures.

They are getting a CIT terminal for ready reference in the reference department. In addition something like five PCs are coming for various uses: word processing, accounting, programming, testing, software testing, electronic mail for ILL, etc.

Five staff are trained; a total of 2.5 FTEs search. If users ask to be present for the search or if the searcher has no knowledge of the subject, the library will perform searches with users present. The library staff feel it's more cost-effective without users present.

While they no longer train users to do OLS, the library does offer seminars to help would-be users (PC owners, etc.) sort out equipment, software, do's and dont's, etc.

8. Benefits

Users discovered many more sources than just what the library carried. ILL skyrocketed. Users have learned to use searching in many different ways. (Library has tried to get people to ask only for what they really need.)

Great impact on both clinical and research aspects of medicine. OLS is "one of the truly revolutionary things to hit information science - it's timely nature transcends any question of utility." Comment from current director, who participated in original pilot test.

9. Costs

None.

10. Subjective Benefit-Cost Ratio

5:5

11. Continuation/Routinization

7/7

12. Secondary Diffusion

To peers: the library staff have written articles on how to improve searching, about online training programs, etc.

To users: they have promoted the service to medical center personnel through demonstrations with a portable terminal, articles in newsletters, etc. Now more of a given as students come in having had OLS exposure in their undergraduate days.

To medical center non-med staff: they also talk to others in the university on "the periphery of medicine."

Contact with NLM continues; intermittent contact with law and main library at school.

Other libraries call; and this library calls other libraries.

13. Other Relevant Information

Highlights: Library's relationship with NLM has shifted - "not as close" - since NLM now engages in a program of cost-recovery itself, and since both charge for ILL.

They may buy NLM tapes for library's online catalog. They may buy subsets of Medline for user searching.

This case is a great example of an organization ready to take off with an innovation despite barriers of top-most leadership and lack of proper facilities.

Also example of exemplary federal funding for subsidized experimentation.

CASE STUDY 14

ONLINE SEARCHING — MID-ADOPTER

1. Adoption Date and Classification

April 1975, fairly early for OLS, but for a biomedical library at a major university probably quite late. This fact was established from NLM records. This library was one of the last to receive training.

2. Adoption Process

The current director came to interview for the job late 1974 or early 1975. She had long been familiar with MEDLINE at previous school and was shocked that this school did not have it. The previous librarian had been a historian and had no technology orientation.

The current director made adoption of a MEDLINE capability a precondition for accepting the position. She also perceived that library usage was low and felt that OLS would be one way to increase it. She also reported that the collection was in poor shape and the physical facilities run down. She was also able to take advantage of a very large estate gift left to the medical school about this time.

She reports doing a lot of public relations work, going around to confer with all department chairmen on their needs and hers. She also was a member of the Dean's administrative decision-making group and sat in on faculty senate meetings.

She describes faculty reaction to her efforts (at upgrading across the board) as "very grateful and supportive".

She purchased a TI-300 and had brochures printed up on OLS services.

A charge was set for each search request but she reports having no real budget limitations. In fact, the first year of her tenure the library spent $100,000 beyond its budget. Because all changes were seen as desirable and necessary and because the funds were there, these over-runs were never questioned.

The first year of operation nevertheless appears to have been somewhat turbulent since some reference librarians left and others were hired. Start up also appears to have been very abrupt. "I came in February; it was up and running in April."

3. Adaptations

There have been no major adaptations but the system has undergone a number of minor modificiations, e.g., several changes in the search form, discouraging OLS for users who could just as easily do hand searches or for standard reference questions, upgrading equipment (from 300 baud to 1200) and addition of more vendors including now BRS, DIALOG, and NLM.

4. Barriers

Attitude and orientation of previous librarian may have been the major factor in lagging adoption of MEDLINE. Prior librarian was not interviewed but was described as a scholar and historian, not a professional librarian and not oriented in the least towards library technology.

Low library usage and weakness of the collection may also have been factors, as perhaps the indifference of prior administrations and faculty.

5. Facilitators

1. Leadership turn-over
2. Experience and training of the new director at stronger library with stronger orientation to technology.
3. Substantial new endowment funds usable for general library renewal

4. Director's forcefulness in setting prerequisites for assuming her new position
5. Dean's support
6. Faculty support
7. Director's perception that library was lagging by not having OLS.

6. Level and Extent of Use

10/11
8/16

7. Use Configuration

Approximately 1500 searches per year, 55% done through BRS (since 1976-77), 42% NLM, 3% DIALOG. There are two dedicated terminals and four trained operators. Requests are made on a form and occasionally are taken over the phone. Output is printed offline and a minimum fee of $5 is charged. Annual yield from user fees is about $13,000, leaving a short fall of about $6,000 in 1982-83.

8. Benefits

Primary benefit reported as "better service".

9. Costs

Social: None.

Opportunity: None.

Financial: $10,000 initially to join the SUNY network. Direct costs from vendors and NLM for 1982-83 were identified as about $31,000.

10. Subjective Benefit-Cost Ratio

5:5

11. Continuation/Routinization

6/7; not in operating budget but reference department role changed to include OLS and new hires must have OLS background.

12. Secondary Diffusion

There has been some diffusion within the system. Staff from main campus library have come to Med School Library for OLS training but they do OLS "minimally".

CASE STUDY 16

BIBLIOGRAPHIC UTILITY — MID-ADOPTER

1. Adoption Date and Classification

RLIN: fall of 1980, middle adopter

2. Adoption process

1972-1980:

- Heavy investment ($1 million) in development of in-house system
- RLIN decision made at University level without consultation with biomedical library
- Originally RLIN pledged joint system development but that arrangement fell apart, stormy period - University systems person left
- Biomedical Library did retrospective conversion 1977-1980, 45-50,000 records using minicomputer system
- COMCAT since 1979 except for pre-1960 monographs
- Biomedical Library feels they should be using OCLC, more suitable for health sciences
- RLIN weaknesses: no other state users, no users group, far fewer users
- Not in their control to change, however.

3. Adaptations

Were able to pick up RLIN on top of prior systems work which led to COMCAT.

4. Barriers

Lack of user group

- Training not good
- Documentation poor
- Not most appropriate system for health sciences
- Developmental status of RLIN.

5. Facilitators

Costs absorbed by University

- Staff motivated to automate
- Experience of prior systems project
- Leadership of Biomedical Library innovative, technology-oriented.

6. Level and Extent of Use

11/11
15/24

7. Use Configuration

2 FTEs for RLIN

- also use OCLC University membership for searching to find cataloging copy
- also use CATLINE (NLM) loaded onto RLIN.

8. Benefits

RLIN allows users to see all campus holdings.

- Library Staff: faster cataloging and acquisitions
- Improved interlibrary loan system
- For Informant: "I like to use it; life is easier when things are more available."

9. Costs

There was no resistance to automation because it had been long expected from in-house automation project (which never quite delivered).

- Attrition solved reduction in force issues.
- We might have been better off continuing with in-house project which promised to lead us toward an integrated library system (which RLIN does not).

10. Subjective Benefit-Cost Ratio

2:2

11. Continuation/Routinization

4/7

12. Secondary Diffusion

None; we do not promote this model to other biomedical libraries, in part because we feel that OCLC is more appropriate for health sciences.

13. Other Relevant Information

This is a case of a forward-looking library unit being forced to accept what they see as a somewhat inappropriate B.U. configuration because higher authorities require it and they do not have autonomy to choose for themselves or the clout to influence decisions at the higher level.

CASE STUDY 17

ONLINE SEARCHING — EARLY ADOPTER

1. Adoption Date and Classification

Initial adoption April-May, 1972. Informant believes she was in third cohort of trainees at NLM. This would indicate fairly early adoption but not original adoption.

2. Adoption Process

The librarian became aware of medical literature database searching while working on her MA in Library Science under the former head librarian, now retired, whom she has recently succeeded. The former librarian was following developments at NLM including MEDLARS and the TWX remote search system put in place in the late 1960s. At that time the John Carrar Library in Chicago was the designated regional center through which NLM search requests were made. The Library found this process cumbersome and slow; turnaround time was three weeks and the batch mode yielded "huge piles of stuff" which did not please the requestors, all of whom were researchers. Thus, the service was not promoted. Request rate during this time was under 20 per year.

Serious interest began when MEDLINE was established and initially promoted as a free service by NLM at the beginning of the 1970s. At this time the librarian was heavily involved in the Northlands Regional Medical Program (a federal program to enhance medical practice in specific areas through special networking and CME initiatives). The new MEDLINE system seemed to be a very appropriate support function for the programs.

An arrangement was made whereby a private medical supplier firm gave the University a grant ($3,000) to start the service, allowing the university to purchase an Execuport terminal and the Northlands Regional Medical Program paid for her training in Washington in April, 1972. She thought that she might have been in the third cohort of trainees.

When she returned from training, the librarian planned a very extensive promotional compaign for the new online service which was implemented throughout the 1972-73 school year. Her program included at least first elements:

- word-of-mouth promotion at the reference desk; when people had problems finding things manually, an on-line search was suggested
- a one-page hand-out called a "user bulletin"
- mailing of the user bulletin to all health science departments for posting
- posters announcing the systems availability for the library door and the reference desk
- some item or article on the service in every issue of the monthly "Bio-Medical Library Bulletin", and
- in-service training program in use of the service for all the other medical librarians in the library

During the 1972-73 academic year, as a result of these efforts 3,000 searches were done, 60% for faculty and most for research and papers, not for clinical problems. There was no charge for the service that year nor were there any charges up to that time from NLM for anyone using the service.

Diffusion efforts with the University, State and region were very extensive and intensive (see Section 12 for details).

3. Adaptations

In the fall of 1973 the library began charging for the service because NLM had switched to a charge policy. The NRMP was phasing out so there could be no further support from this source. Several efforts were made to get financial support from the university but the main University Library, which controlled fiscal policy for all library units on campus, persistently refused to support the request. None of the other libraries in the system were interested in OLS for a number of years. Reacting to a major presentation by the librarian in 1976, the library directors expressed some interest, but the general view was that "it was a good thing for medical people to do but, since the service was aimed at individuals, it should be paid for by those individuals."

The service ran at a deficit of $5-800 per year in the first few years of charging but now breaks even, not counting staff time.

Charging policy has also been modified slightly over the years: currently the $5.00 minimum fee is for 25 references without abstracts. Although 75% of searches continue to be of MEDLINE (now searched through BRS) several additional database services are now used including several special NLM databases, DIALOG, SDC, GTE-NET and others.

4. Barriers

Fiscal limitations, lack of control over own budget, resistance by other librarians in the University System. Strong support by former head of library, now retired.

5. Facilitators

Network involvement of librarian knowledge of NLM and tracking of developments there. Participation in other federal programs through which training could be supported (NRMP).

Private industry grant
Strong initiative of librarian in promoting programs
No charge policy of NLM during start-up period.

6. Level and Extent of Use

11/11
15/16

7. Use Configuration

Four terminals are used nearly full time by 7 trained staff persons. Each search takes about 40 minutes including patron interview and about 5,000 searches are now made per year, not counting ready reference use which is heavy. 75% of searches use BRS to access MEDLINE. 15% of searches are on special NLM databases. 10% are spread among other vendors including DIALOG and SDC. The $40,000 of direct costs per year are almost balanced by user fees of about $40,000. In addition the library has a $5,000 university grant to provide end users with OLS training for home (not library) use. These courses are popular (100 responses from only 30 flyers sent out).

8. Benefits

To Clients:
(1) saved time
(2) "substantially changed the way people use the library": some don't come in as often
(3) able to do much more thorough searches
(4) using sources they would not otherwise have been able to use, or would not have thought to use (e.g., EXIC).

To Library:
(1) Made it more prominent
(2) Opened up bibliographic instructions
(3) Has put librarians into more direct and substantive relationship to clients
(4) Had an impact on the kind of materials collected e.g., started a health planning file reviewed journal holdings (in terms of what searches typically show up).

To Self:
(1) I liked searching a lot, a lot of personal satisfaction
(2) It gave me a specialty
(3) It allowed a closer contact with clients, many of whom you would never have seen at the reference desk formerly
(4) It gave me an opportunity to be much more active professionally.

9. Costs

Social: There was some antagonism from other librarians on campus. With this library, there was considerable stress on reference staff when decision was made that all should get OLS training. Some could not do it as well as others and it was tough to work out those differences.

Opportunity: Possibly they could have offered a clinical librarianship program to the departments if they had not become so committed to OLS.

Financial: Staff costs absorbed in role redefinitions within the library; line and other direct costs originally subsidized from outside, now $40,000 per year balanced by user fees.

10. Subjective Benefit-Cost Ratio

5:5

11. Continuation/Routinization

7/7; continue to sign up for more new services and moving towards direct user searching. However, annual budget has not been altered and there is still no OLS line item.

12. Secondary Diffusion

Internal: The librarian has on many occasions demonstrated and in other ways promoted OLS as a function that other libraries in the University should adopt. However, she has met with continued resistance to the concept.

External: Extensive out-diffusion began with the first year when the service was actively promoted to all participants in the Northlands Regional Medical Program. Notices were sent to all participating hospitals (which included all the hospitals in the state), and where special libraries had been established under the program special mailings were arranged.

News items on OLS were inserted in regional journals. Talks were also given to local and state library associations and talks and demonstrations were made before local and regional chapters of SLA and ASIS.

The yield in terms of Medline requests from around the state was not impressive, however.

13. Other Relevant Information

This is a very strong and long-time OLS adopter which has been successful in spite of fiscal and other resistance from higher levels of administration. It appears as an island of innovation within a larger campus library system.

CASE STUDY 19

BIBLIOGRAPHIC UTILITY — EARLY ADOPTER

1. Adoption Date and Classification

Was one of the original libraries in WLN and was involved to some degree in the development process. A precise date was not given but it appears to have been between 1974 and 1976.

2. Adoption Process

Involvement with outside contractors for cataloging began with an RFP won by Xerox in the late 1960s, to make a printed union catalog, to be updated every two years. All books for the system were acquired centrally and Xerox made all records machine-readable.

Awareness of what was to become WLN began in 1968 or 1969 when state librarian met regularly with all the directors of city and county systems in the state and promoted the concept of shared resources. The state librarian was "extremely instrumental in stirring up interest," and worked behind the scenes for 10 years with libraries, officials, and state legislature before it actually happened. This person also argued that they should use the Library of Congress system. A decision was made very early that WLN would have a high caliber database using MARC cataloging and would not deviate from that.

OCLC was never discussed; it was seen as too far away and not oriented to public libraries. Although the state library sometimes "compared notes" with OCLC, the development of the two systems was entirely parallel.

Leadership always assumed from the beginning that they would be a part of WLN. Xerox finshed their contract in 1971-72 and decided to get out of the cataloging field. At this point because Xerox did not use MARC, the system had to reformat their machine-readable entries to be compatible with WLN. This was at a time that WLN was in development, and, in effect, the system helped pay for WLN development. Also, in the early 1970s the legislature appropriated $2 million to get WLN off the ground, an amount later augmented to $5 million. The legislature had one provision: that the system be self-supporting once it was up and running.

Despite early and continued support of WLN, the system has never adopted certain functions such as the acquisitions system, believing that an integrated acquistions and circulation system tailor-made to their own needs is better. They use ULYSSES.

3. Adaptations

No real adaptations: "We negotiated some things and got them changed", e.g., provision which would allow individual library COMCATS.

4. Barriers

None evident.

5. Facilitators

(1) Proximity: it was closer then any other utility

(2) Promotion by state librarian

(3) Willingness of WLN to adapt system to individual library needs

(4) Strong financial base of system which allowed them to support WLN during developmental phase and convert their own records

(5) Early system experience with another vendor (XEROX) and early development of a machine-readable catalog

(6) Centralized acquisitions for the 37 library sytem.

6. Level and Extent of Use

11/11

11/24

7. Use Configuration

The system has four full-time WLN-dedicated terminals and is getting more. Fifteen or more staff members are WLN-trained and operators represent four FTEs. The system is used for all cataloging, and retrospective conversion was completed long ago. The system is used for all authority control, most ILL holdings searches and some pre-order searching. It is not used for acquisitions or serials.

8. Benefits

The main benefits of membership cited had to do with speed, faster cataloging, faster ILL and faster item identification and retrieval.

9. Costs

Social: One person quite as a result of adoption, apparently resisting terminal use and fearing health problems.

Opportunity: None; funds allocated to cataloging would have had to be used for this purpose.

Financial: "It probably has not saved us money; WLN is not cheap."

10. Subjective Benefit-Cost Ratio

3.5:3

11. Continuation/Routinization

7/7

12. Secondary Diffusion

(2.5) System gets many visitors who want to see how WLN works for them. Some of these are sent by the State Library. Our informants have also spoken favorably about WLN at ALA where they emphasized that it was the most public library-oriented of the bibliographic utilities.

13. Other Relevant Information

In spite of early adoption, heavy current use, and use as a demonstrator site for others' systems does not seem overly enthusiastic about WLN as judged by their enthusiastic B/C ratings. Nevertheless, they are clearly committed to long-term continuation and can be said to have "routinized" the innovation.

CASE STUDY 20

ONLINE SEARCHING — LATE ADOPTER

1. Adoption Date and Classification

1981; late adopter.

2. Adoption Process

Innovator aware at time of Bay Area Reference Center in San Francisco (early 1970s).

Recalls that it was discussed at a 1974 meeting at local university. There was a presentation by a university group on DIALOG and BALLOTS but there was no "hands-on" training.

She may also have read about MEDLARS (NLM database) before 1974. She recalls that one of the hang-ups for other libraries in early days was the very strong-sense of ownership (of MEDLINE?) by the local university medical school.

She also noted that it was introduced into the academic libraries of nearby major universities in the mid 1970s, but nothing happened among the public libraries for years.

System was struggling with the question "Who are we?" and OLS seemed to be related to the anwser. Her confidence in OLS was triggered by observations of librarians who were using it daily and saying how much it helped them. This was at a meeting at the local university about 1979 at the invitation of DIALOG which was then explaining system enhancements.

A former system staff member was explaining how he was using OLS in the special library of a high tech firm and offered to do a "dog-and-pony show" for system and its branches. The innovator tried to get the friends-of-the-library group to endorse the idea but it languished for a year and system funds were very tight.

In 1980 she had it inserted in the public service budget. It then had to go before the management group. The fact that both the public library and the State Library already had it was used as leverage in making the case and both were looked at as possible models. It was thought best to put it in a community library first (surprisingly, considering the fact that at the public library the opposite course was taken, making OLS a central office function), but when it was cost out it was much cheaper than anticipated so that installation was proposed for the central office as well.

When it went before the library board it was championed by a corporate official who was a prestigious member and no one questioned it. Implementation was in 1981 with 1200 baud terminals at both the central office and the community library. NYT and DIALOG services were purchased initially.

3. Adaptations

BRS and NLM were added later in 1981 and four staff got training on all these services. All vendors but DIALOG were dropped in 1983. Another community library in the System has pressed for OLS but has been put off on the theory that the first branch had a user community which was clearly more linked to business and government.

In early 1980s, the system was introducing an automated search system called ULYSSES (which operates out of Canada). There were a lot of psychological/emotional costs in doing this which might have obscured consideration of OLS. Two Apple II Computers have also been installed in branches for patron use but neither has a modern for OLS. "We are still wondering what our role is."

OLS was advertised as a service to the branch reference librarians but not to the general public, except at the one branch which was originally granted an OLS capability. That branch has advertised modestly with a press release and local newspaper coverage but there was not much of a response despite the fact that the service was offered free of charge.

4. Barriers

Lack of clear priority
Perceived cost
Absorption in adoption of other technologies (e.g., WLN, ULYSSES).

5. Facilitators

Awareness, understanding, persistence, network involvement of the innovator

Reduced cost of OLS

OLS champion on Library Board problem

Proximity of adopter libraries, first university then public

Influence from former staff member now librarian at special library in hi-tech firm.

6. Level and Extent of Use

10/11
9/16

7. Use Configuration

No figures were available on actual number of searches but annual total is probably less then 1/2 FTE. There are 2 terminals dedicated to OLS, one at the central office, one at the designated branch. There are four OLS-trained staff and DIALOG is currently the exclusive vendor used. Total costs not counting staff time are about $15,000 per year carried under the "professional services" line in the annual budget.

8. Benefits

Greater depth of information access
Greater speed of information access.

9. Costs

Social: "Some anxieties at the beginning" by the two who were trained. OLS turned out to be more technical and more difficult than they had anticipated. Other staff were not affected in any way.

Opportunity: Could have used funds for more Apple computers and more video machines.

Financial: Annual operating: $15,000. No extra start up costs.

10. Subjective Benefit-Cost Ratio

4:5

11. Continuation/Routinization

6/7

Verbally committed and intend to expand use. Have not cut out any other functions to do it. It is mentioned in the annual report but publicity is so far minimal except at designated branch.

12. Secondary Diffusion

Most libraries in the system are very small (40-55,000 volumes). They have considered that in the future OLS may be the way to go to expand services and they may then make with specialists riding circuit. Nothing so far, however, and one additional branch eager to move ahead has been put on hold.

13. Other Relevant Information

System has been preoccupied with other libray automation tasks. It was an original adopter of WLN but followed lead of public library on OLS, reversing roles.

CASE STUDY 22

BIBLIOGRAPHIC UTILITY — MID-ADOPTER

1. Adoption Date and Classification

May 1980: Date officially joined WLN. Essentially the Library was moved by WLN and its participation was seen as a key to continuance, strengthening and expansion of the system.

2. Adoption Process

It is hard to say when the Library as such became aware of BU's because key personnel related to cataloging did not join until 1975 and 1976. Head of WLN activity at the Library worked at a corporation from early 1960s and was involved there in development of a computer-produced catalog. Subsequently she worked with various efforts in the region which sprang from early corporation work to use the MARC tapes to develop a system for regional libraries. (This informant related the developmental history of the WLN which is included in our field notes from the site visit.) She was continuously active in the SLA, holding offices and attending meetings regularly, and partly for this reason was thoroughly familiar with other BU developments such as OCLC and RLIN.

When she arrived at the Library in 1976 with the clear charge from the new library director of upgrading the cataloging department she found that cataloging was in "a horrible mess." A thorough systems analysis was done which indicated that there were huge backlogs. She proposed that the first priority task was to convert the catalog to machine-readable form and bring it up to date before joining any cataloging network. The main job was to convert the catalog to MARC format. She had some trouble convincing the board that this very expensive task was needed before they could look at any more glamorous and visible high tech innovations. To appease the board they proposed that a microform catalog be produced from the conversion process (even though this was seen as clearly an interim product of no long term utility) and for $20,000 they hired an outside consultant to argue their case to the City's Office of Managment and Budget. They said it was okay but had no money. Nevertheless, this sectioning was important as a way to open the door to a decision by the library board to use $500,000 in endowment funds over a 3 year period.

During this period (1977-1979), was bringing up its bibliographic system and still shaking it down. It was then a consortium of relatively small libraries and was very much interested in adding the Library because it would greatly enlarge its holdings list and it was perceived that many other public libraries in the region were holding back, waiting for the Library to join.

The Library had special interest in WLN for 3 reasons. First, WLN was local and because of the importance of the Library would likely bend to the Library's needs. Second, the cataloging head had full knowledge and understanding of WLN's development and in fact, was on the WLN library automation committee even though her library was not a member. Third, WLN was seen as the best BU for at least 2 reasons: (1) it had the cleanest database, and (2) it was the only one of the three which had authority control.

In 1979, about 20 members of the WLN wrote a letter to the State Librarian urging that the Library be induced to join and proposed giving all the LSCA funds for the following year.

In the later part of 1979, the cataloging director of the Library and her assistant spent six months "on the road hammering out a contract," arranging to get free use of six terminals. WLN, being aware of the fact that the Library would be looking at other vendors (for putting their catalog online), said they would meet and beat all other bids. The Library received $225,000 in LSCA funds in 1980 and as part of this arrangement formally joined WLN in May 1980.

After the adoption decision, implementation has proceeded in a series of steps which are still going on. Cataloging online began in May 1980 but conversion and entry of all books in WLN took 2 1/2 years, being completed by the end of 1982. All serials were in the system by the end of 1983. The card catalog was frozen in February 1981 (8 months after WLN adoption). Training of all cataloging staff took one year. Many were described as very frightened but the head cataloger developed a highly participative implementation process, setting up five committees and involving 40 staff members on those committees (the Library has a staff of over 100). Through these committees a booklet and a training manual were developed and training provided for all public services staff.

All went smoothly until the end of 1983 when conflict erupted over the decision to throw out the card catalog. There were many complaints from rank-and-file reference librarians (all staff are unionized) who did not like the new filing rules and felt a sense of loss of control under the new system.

In late 1982 the Library adopted the acquisitions module of WLN.

It is clear that the Library plays an important opinion leadership role in WLN and its joining was the catalyst for a great expansion of WLN membership. However, specific Library or Library staff dissemination efforts were not explored in detail during the site visit.

3. Adaptations

The addition of the acquisitions module was the only item specifically cited. It generally appears that the Library is content to let other WLN members experiment with new modules before it makes adoption decisions.

4. Barriers

Three barriers seem to explain the delay in adoption of WLN. First was the relatively chaotic state of catologing prior to the advent of the new director and cataloging chief. A second factor was the high cost of inputting such a large set of records into the system. The third factor, largely overcome but not completely so by the strongly participative and step-wise implementation process, was the suspiciousness or fear of staff of computer technology as such. A fourth factor overcome by state and federal funding and by cooperation of other area libraries was the slenderness of WLN resources.

5. Facilitators

At least ten facilitating factors stand out:

Senior staff of Library experienced with technology including all current BU offerings and detailed knowledge of WLN development and current status.

The embeddedness of senior Library staff in local and national networks which provided valuable and continuing links to current state-of-the-art, key consultants and decision-makers in the region, and motiviated them to live up to their reputations as innovation leaders.

Entrepreneurship of new Library leaders: Eagerness and competence in making deals and negotiating favorable terms for entry, as well as an ability to influence key political figures on board and in state government.

The eagerness of other systems to bring Library into WLN.

The endowment funds of the Library which could be drawn on for expensive conversion effort after a strong case had been made.

The Federally supported LSCA grants program which allowed entry of Library accords into WLN system

Size and reputation of the Library in the state and region which made it a prized addition to WLN and an automatic opinion leader among region libraries in and out of WLN.

Improvements which were being made continuously in WLN as a system over the years when adoption was being considered.

The perceived high quality of the basis WLN database.

The participatory nature of the implementation process.

6. Level and Extent of Use

11/11 "It is used just about all the hours it is up."

19/24 They are unable to use electronic mail box or ILL functions because of the high volume of their requests (10,000/yr).

7. Use Configuration

It is important to note that the Library is by far the largest library in WLN to date and their involvement and use is substantial. 46 staff members are trained to use some aspects of the system: 22 catalogers and 24 reference librarians. There are currently six dedicated terminals (Hazeltines) which will be replaced in the next year with IBM PCs under an LSCA grant. The System is currently supported as a line item in the Library budget for $225,000 per year. Most available modules are used except ILL and electronic mail. It is also not clear that it is used for collection development.

8. Benefits

Benefits for patrons: Can do more for less money and we can have a complete catalog in every branch.

For the organization: The use of standards (so that cataloging can be standardized).

9. Costs

Social: Informants clearly felt the social costs, noting that automation can only be introduced one piece at a time.

10. Subjective Benefit-Cost Ratio

5:3; "In 5 years we will not be using as many WLN functions."

11. Continuation/Routinization

6/7

12. Secondary Diffusion

Considerable internal diffusion (e.g., to reference staff and all catalogers). We do not have the story on external diffusion but assume that opinion leader status of the Library led to expanded membership for WLN. Also, senior staff continue to be active in regional/national networks. Not clear that they actively promote WLN as such, however.

13. Other Relevant Information

The Library illustrates the point that opinion leaders are not necessarily the most innovative. Rather they are the shrewdest adopters, only adopting innovations at the moment of highest personnel advantage, and after the technology has been proven by others.

CASE STUDY 24

OUTPUT PERFORMANCE MEASURES — EARLY ADOPTER

1. Adoption Date and Classification

Decision to try not made until mid/late 1983. This puts them clearly behind Chester, PA which implemented from October 1981 to spring of 1982 and Balitmore County where prototype OPM was in place in 1980 and full adoption across the board in 1982. Implementation is only now under way at the Library as of June 1984.

2. Adoption Process

For years the Library had collected and annually reported some statistics such as circulation, program attendance, in-house use, and library card registrations. Also from time to time these statistics were reported in per capita terms.

However, measures of user satisfaction, fill rates and reference turnaround time were unheard of before the 1980s.

When the OPM process began in 1980-81, the Library director was involved in development of the planning manual.

The PLA manual was distributed to all senior staff in late 1982 and comment was requested. The goal was to familiarize staff with what PLA was proposing. Reaction was mixed; some thought it might not be too useful; others wondered what it could be used for, but the majority reaction was: "It's interesting; we should try it."

Primary impetus came from our chief informant on this innovation, Director of Community Library Services (i.e., central office supervisor for the 22 branch libraries and mobile units). He was supported by the library director who had been involved in development of the manual through PLA, wanted to see it implemented at the Library but did not aggressively push it. The Director of Community Library Services then wrote memos for his chief and was involved in the ALA planning process.

The decision to go ahead with implementation was not made until the latter part of 1983.

A user survey instrument was developed and administered over a one week period in October 1983 and again in April 1984. A total of 10,000 questionnaires have been passed out. First report of measures to library staff was February 1984 and included almost all items suggested in the manual. Volunteers were used heavily to collect data with a paid volunteer coordinator. During implementation our informant noted that he had a number of discussions with staff at prior OPM adoption sites, e.g., Baltimore County, Montgomery County and Nancy Bolt in Cincinnati.

As of January 1984, the data had not yet been presented to the board and had not been used in any specific ways other than to inform the staff. It was expected to be used in a Library "planning process which we are going into".

All branches and units serving the public took part in the survey and results were distributed to "all departments and Community Libraries".

3. Adaptations

Implementation so far has been essentially "by the book"

4. Barriers

None apparent.

5. Facilitators

Involvement of top two decision makers in OPM development activities, in ALA and PLA, and connections to the "Maryland Mafia".

Availability of volunteer labor in large amount. Availability of central office function which could prepare and print forms, tabulate results.

6. Level and Extent of Use

LOU: Not really applicable because implementation has not been completed; presumably when they begin planning process, score will be 8 or higher. Now it would be 5 or 6.

46/66

7. Use Configuration

Data collection sampled for two weeks per year of all major library service functions plus a four day sample user satisfaction survey. October and April, collected and tabulated centrally and calculated on a per capita basis where appropriate. Data has so far been reported in summary form but not used and not yet reported to the board. It is expected to feed into a formalized "planning process" which is not yet under way.

8. Benefits

It is seen by the informant as "a tool to manage and a tool to leverage". "The value may not be so much in figures themselves as in the relationship between them."

No benefits were cited as realized to date.

9. Costs

Social: Because the sample time is small in comparison to the annual workload of the average staff person, it is seen as small ("not that big a deal"). Use of volunteers greatly reduced pressure on paid staff for conducting survey aspect.

Opportunity: Speed of clerical operations reduced.

Financial: Use of volunteers reduced out-of-pocket costs, but informant admits that if he had actually costed out the whole process, "I suspect it's no small piece of change."

10. Subjective Benefit-Cost Ratio

4:5

11. Continuation/Routinization

0/7; "I wouldn't say (our library is fully committed to continued use); we just started it."

12. Secondary Diffusion

Internal only and only circulation of first survey and ratio statistics to staff and branches. All staff and branches involved in data collection.

13. Other Relevant Information

It seems likely that the Library will go on with the OPM process, but so far it has essentially been a concern to a few central office chiefs. There has been no widespread participation in development and no real "ownership" by departments and branches.

CASE STUDY 25

BIBLIOGRAPHIC UTILITY — LATE ADOPTER

1. Adoption Date and Classification

The Library is not currently a full member of WLN. It is now under consideration but it appears likely that it will not happen this year. However, the Library has taken advantage of WLN and can be counted as a partial adopter as of 1982. It is the largest public library in the state which is not a member. Therefore, its "late adopter/non-adopter" status is reasonably clear.

2. Adoption Process

The librarian has been aware of WLN "from the beginning" but had always worked in small libraries which she says have never been a WLN market. She always thought it was a good idea but the question of cost choked off interest.

She notes that when she found a way to make it affordable she did. Shortly after she came to the Library she attended a statewide meeting of 20-25 librarians at which WLN dial-up services were being demonstrated. She realized at this meeting that her holdings could be entered into the WLN database at minimal cost (as non-members) if she had a terminal.

A WLN staff member referred her to a nearby community college which had an old Hazeltine terminal they were not using and were willing to loan to her. She then found a college student who enjoyed terminal input and worked very rapidly for $5.00 per hour. Therefore, in the fall of 1981 she started using WLBR, a WLN function which allowed entries of items one year old or older if the purpose is to produce a microfiche catalog in conjunction with another library which is a WLN member. Under this arrangement title entries cost $0.11. The county library with which the Library had a cooperative agreement was the WLN member. She had written WLN explaining that she would eventually want the tapes of her holdings and become a WLN member. She reports that WLN staff were helpful throughout but had second thoughts about the arrangement since it might threaten their overall cost recovery policy. Thus, although the Library has been allowed to continue inputting one year old records as a "grandfather" other non-WLN members no longer have this option.

In 1984 the librarian wrote the full cost of WLN membership into her budget proposal as part of a reciprocal arrangement with the county library but WLN costs went up so that her original estimate of $21,000 was far short of the $35,000 that 1983 membership would have cost her.

Unsure about future costs she backed out. However, WLN has sent her a counter-proposal for one terminal, no reference access and restricted inquiry use that would bring the cost down to $23,000, close to her originally budgeted figure. She does not think she will accept this offer and after July will be off the WLBR system. At that time she will get the tape from WLN to use in her own circulation system but will have to find some other way to continue entries. As of June 1984, 104,000 of the Library's 120,000 titles are entered.

3. Adaptations

Essentially what has been adopted so far is an adaptation which makes partial use of some WLN features.

4. Barriers

Cost is the overriding barrier issue.

The city is a largely working class industrial port city with some recent high unemployement.

Inability of WLN to make key concessions to bring costs down.

5. Facilitators

Network involvement of librarian.
Resourcefulness of librarian.

Willingness of WLN to make special arrangements (adaptability) up to a point. "WLN has been helpful and patient."

6. Level and Extent of Use

3/7
6/24

7. Use Configuration

Used almost exclusively for retrospective conversion which is 90% complete but does not include latest year of acquisitions. Will be used for automated circulation system.

8. Benefits

WLN has been helpful in developing a machine-readable database. However, benefits are probably not yet very visible (awaiting implementation of new circulation system).

9. Costs

Social: None yet but catalog librarian will eventually have to work on the reference desk; she is worried about doing this but no other solution has been arrived at as yet.

Opportunity: Librarian felt machine-readable database was essential but no other library functions or operations suffered as result.

Financial: Thus far, minimal because of equipment borrowing, using low cost system features and high production/low wage personnel.

10. Subjective Benefit-Cost Ratio

2:3

11. Continuation/Routinization

0/7

12. Secondary Diffusion

WLN has blocked other libraries from going the Library route to partial adoption.

13. Other Relevant Information

In this case clearly backwardness has nothing to do with non-adoption. The librarian is well-connected to local and regional networks, is energetic, resourceful, and innovative. Judgement about not joining has been carefully thought out in terms of all available possibilities, resources, and the needs of her library and community.

CASE STUDY 26

ONLINE SEARCHING — NON-ADOPTER

1. Adoption Date and Classification

Non-adopter; seriously considering adoption for 1985.

2. Adoption Process

Librarian was aware of the concept but not the actuality before 1970 in library school. Later read about it. ERIC was first operating search system she knew about. She later received one week of training while working at a public library in area. However, it was not considered for use at that time; there was no money and no demand.

In more recent times she has noted that there are vendors every place and it has become something that is talked about a lot. She has talked to other librarians who have used it and like it. Her own reference librarian has had one week of OLS training at the local University and is "hot to trot". The librarian sees the potential of searching both through vendors like DIALOG and through the bibliographic utility WLN, using a computer terminal that they anticipate having access to soon.

However, she is hung up on the charging issue, saying they would have to resolve the issue of who pays. She says, "I don't see how you can charge for OLS when you don't charge for book borrowing and other services." Therefore, it becomes "a question we just keep postponing."

Document delivery is also an issue that troubles her. If they don't have cited documents what good are the citations?

She predicts that when the new building is finished in 1985 and they have acquired an IBM PC which is in the budget, then she believes they will do some reference searching. The county library is already talking about offering searches to the public. "If they do it, then there will be pressure on me to do it."

3. Adaptations

N/A

4. Barriers

(1) Size of library
(2) Nature of clientele and lack of demand
(3) Lack of resources
(4) Problem of other priorities.

5. Facilitators

(1) Training and enthusiasm of reference librarian

(2) Vendor promotional activity

(3) Idea talked up by other librarians in region

(4) (Potential) pressure to keep up with services offered by county library

(5) Probable acquisition of IBM PC with search capacity.

6. Level and Extent of Use

3/7
0/16

7. Use Configuration

N/A

8. Benefits

N/A

9. Costs

Not yet clear what they will be; not costed out. There should be minimal social costs because reference librarian is already at least partially trained and eager to start doing it.

10. Subjective Benefit-Cost Ratio

N/A

11. Continuation/Routinization

N/A

12. Secondary Diffusion

N/A

13. Other Relevant Information

Librarian is also poised to adopt WLN and a partially automated library system, already having 90% of holdings machine-readable. OLS is seen as part of this picture which will not be realized until major facility renovation is completed in 1985. Probably she will go for a fairly low profile, free service similar to current pattern in the county and the Library's central facility.

CASE STUDY 28

BIBLIOGRAPHIC UTILITY — EARLY ADOPTER

1. Adoption Date and Classification

Adoption somewhere between 1974 and 1976, making them early adopters.

2. Adoption Process

Prior to Adoption: Library staff were aware of bibliographic utilities through the literature of the time. "It would have been hard to miss." The public library had an extensive backlog of books to be cataloged, in fact, a city warehouse full of materials. The warehouse was full and something had to be done. There was a clear push from the city manager's office; the assistant city manager and his staff helped the library do an extensive study before adopting.

Choice/Adoption: OCLC was the utility of choice: "It was established, not experimental." RLIN was the only competitor, but was not seriously considered: "It did not have the database or the track record." Many other libraries were adopting bibliographic utilities. From the study it was "clearly evident that (adopting OCLC) would be cost-effective." Making the case for OCLC to the city was no problem. It was proposed in the library budget and accepted. The study was "a dramatic piece of evidence." "OCLC probably exceeded the savings projected in the study."

Implementation: One library staff member described the use of OCLC as "an epiphany." It vastly reduced staff (and status of staff) devoted to cataloging (from 24-25 FTEs down to 1 cataloger and 3 clerical - can that be true?). They installed two terminals dedicated to OCLC. No one was laid off; staffing was reduced through a combination of attrition and reassignment to public service. The backlog was eliminated.

3. Adaptations

They now use OCLC for ILL, to verify bibliographic information, to answer reference questions for branch librarians. They participate in the South Bay Reference Network (SouthNet). They mentioned needing a PC for more efficient use of ILL.

Their use of OCLC is part of a plan to make greater use of databases. They would like to have an online catalog. They need something that links RLIN and OCLC (the latter is not so good as a union catalog - the Library wants to know what other local libraries have in their collections). Through SouthNet they have access to one another's collections.

4. Barriers

They have created an interface between their automated circulation system and OCLC - matching bar codes are put on the tapes so that the bar codes don't have to be put on individual books. BU requires greater uniformity than the inhouse cataloging system, making it harder to transition. There was trauma in doing away with the shelf list. There were changes in the Dewey System that made cataloging harder.

5. Facilitators

There was pressure from the city to deal with the backlog of books. The idea of a BU was a "pretty positive thing."

6. Level and Extent of Use

11/11
10/24

7. Use Configuration

I would characterize this library's use of OCLC as smoothly routine, starting to make adaptations that will result in a more integrated library system (for example, the interface between the circulation system and OCLC).

8. Benefits

Limit on spending = $75,000. Staff cited the "vast reduction of the arcane art of cataloging." The savings in staff devoted to cataloging was noted. They also mentioned the speeding up of getting acquired materials on the shelf and the improved quality of cataloging.

9. Costs

Staff noted that OCLC demonstrated such immediate results that "only the most recalcitrant old codger" would not be swayed. In other words, they could think of no costs of having adopted OCLC. When asked about opportunity costs, they said the only other thing they could have done with the resources was to obtain more warehouse space for the growing backlog of uncataloged books!

10. Subjective Benefit-Cost Ratio

5:5

11. Continuation/Routinization

6/7

12. Secondary Diffusion

The library has hosted OCLC users workshops. Groups of librarians have come to tour the library to see OCLC. They have had requests from the local junior college to allow temporary use of OCLC terminal for cataloging.

13. Other Relevant Information

Highlights: This case is a good example of the amount of push needed before an organization takes action. Here, the combination of a full warehouse and pressure from the city government resulted in adoption of a BU.

This library is just now forming a technology committee to address automation issues across the board.

This library appears to have a solid, forward-looking management staff; they have appreciated the pressure from the city goverment.

CASE STUDY 29

ONLINE SEARCHING — EARLY ADOPTER

1. Adoption Date and Classification

The Library installed OLS using Dialog in 1973 during the Dialib Project, funded by NSF and designed as an experiment for public libraries. Early adopter.

2. Adoption Process

Awareness/Adoption: According to Library senior staff, the Dialib Project was created to "pay back" some the public monies used to develop DIALOG at Lockheed. The participants in the project don't seem to have been chosen in any systematic fashion. The technology agent for the Library has a link to someone at Lockheed. When the project people called, the Library was enthusiastic about participating in the four-year effort to explore provision of search services through public libraries. Participation did not cost anything except staff time (which cost a lot, as the publics were to find out) so adoption was not a question.

Early Implementation: For the first two years, everything was free, including the terminal and training provided by Lockheed. After the second year, the costs were to be shared, with the libraries incurring the expense of connect time. All the publics in the project chose to pass on the costs to their users. There was considerable promotion of services to users - clients were mostly small businessmen, students at the nearby university, and sci/tech professionals with a few citizens ("too esoteric"). The library staff found it a challenge and were doing 30-50 searches per month. Difficult to keep up with the proliferation of databases within DIALOG (there were 15 the first year and 60 by the third year). They stopped promotion - couldn't keep up with demand with limited staff. At least one public library terminated its participation at the end of the second year, citing drain on staff. Searches are performed with patrons present.

Later Implementation: In the second or third year of the project, the Library purchased its terminal. The head librarian made a proposal to the city manager to be approved by the city council. The purchase got "pass-through approval" and was incorporated into the library budget.

In the third year of the project (1976) the library began charging for online time. The Dialib Project report shows that presearching preparation time went way up at this point because library staff were reluctant to pass the costs of trial-and-error on to users. Such was not so much the case at the Library, where the staff seems to have adopted the attitude that experimentation in the search for information was part of any search, manual or online.

The city council wanted the library to be self-sufficient, so in 1982 the library found it necessary to charge for staff time in performing OLS. It was at this time that usage really began to drop; the library was doing no more than 1 or 2 searches per week, for University students and small businessmen. The terminal is set apart for OLS only in a special area - "hidden." Not used except for user searches. The now 17 public library branches do not have their own search capacity but have them done by the main library. A Hispanic project for user access maybe going on in low income branches.

Of the four area public libraries in the Dialib Project, the Library is the only one still doing searches. Now the Library styles itself as something of a center for OLS: it is the only member of the South Bay Cooperative Library System (includes 9 libraries in 2 counties) that has OLS. The Library sends staff twice per year for training.

3. Adaptations

None, in fact OLS is just hanging on. The senior staff have many plans for the future if funding can be obtained. Electronic bulletin boards, other services that the public can use themselves, especially because of the sophistication of computers in the area. An enterprising University student has installed a coin operated Apple to be used by the public. The library staff helps users get started. (Other examples - more plans.)

4. Barriers

Lack of funds to implement plans (the Library lost $60 million through mishandled investment of its stock portfolio).

5 Facilitators

None.

6. Level and Extent of Use

9.5/11
9/16

7. Use Configuration

They still have the same terminal they purchased during the Dialib Project. Staff use the terminal about 4 hours per week or .05-.10 FTE. Two staff currently perform searches. Searching is done on a cost-recovery basis.

8. Benefits

(1) OLS helps library to continue to be useful to the public.

(2) Library staff working with OLS gain familiarity with the system. It's appealing to be trained.

(3) The problems encountered, etc., have given the library a framework for planning. It was the first occasion for them to face up to the fee question.

(4) Their use of OLS to date has been small enough that it hasn't threatened traditional librarians.

9. Costs

(1) OLS costs people money.

(2) Their use of it to date has been like "having a little taste, then putting away the jug."

(3) It is difficult for those staff who fail as searchers even though they've been trained.

10. Subjective Benefit-Cost Ratio

5:5 (if the library can implement its OLS plans) or 5:1 (if it can't: if OLS stays at the same level, the library will be so far behind that costs will outweigh benefits).

11. Continuation/Routinization

7/7; DIALOG is in their base budget; in addition, their plans for OLS are continually resubmitted in the budget in the hope that money will be available for implementation. They pay attention to developments in the field, go to vendor demonstrations, etc. They are getting some PCs for training librarians in computer literacy.

12. Secondary Diffusion

The Library spreads the word about OLS through the South Bay Cooperative Library System.

At least one paper has been written (the staff attend ALA and Online conferences, etc.).

One searcher from the Dialib Project days wrote an article for the science and technical library journal, published in 1980.

13. Other Relevant Information

Highlights: The Library remains firm in the belief that OLS is the wave of the future. One staff commented on the need to switch the library from hardcopy to online reference services, but they are quite far from this at this point. However, they search OCLC for reference, so that's a start. Money is clearly the major inhibitor.

The contrast between impact of federal stimulus of OLS in public libraries versus on medical libraries could hardly be more striking. In public libraries, the service was seen (and was) an add-on function; in the medical libraries, the service enhanced a function already in place - in-depth provision of information.

CASE STUDY 31

BIBLIOGRAPHIC UTILITY — LATE ADOPTER

1. Adoption Date and Classification

1982: Got search-only on RLIN; April 1983 began cataloging using RLIN, late adopter.

2. Adoption Process

Prior to 1978: Head of technical services was generally aware of BU but all cataloging had been done by the county processing center at least since 1962 when she came to work at the library.

The county processing center's work was totally unsatisfactory. The Library had to adhere to their schedule and it sometimes took years to get books cataloged. Many peninsula libraries had dropped participation in the processing center but the head of the Library "felt a loyalty to it."

1978: After the cutbacks due to Prop. 13, this Library and other libraries were asked to share staff with the county library; she and a clerk worked one half-day per week and she got acquainted with OCLC on a one-to-one basis, learning to do searching. This started her thinking towards the use of a BU.

Meanwhile, the situation with the county processing center had gotten worse. Technical services head: "I was in favor long before the Library Director; I knew he had to do something."

1980-1981: Another library in the Peninsula Library System started to use RLIN and liked it. They felt it was more facile, more interactive, and can do more things than OCLC. They had search-only, then went to cataloging after a year. Their cataloging librarian probably sold half the RLIN accounts on the peninsula.

The state database project came up. The State Library wanted to encourage public libraries to produce machine-readable records for the state database. They would give $6,000 for start-up funds for libraries to buy terminals, join any utility. Libraries cataloging over 5,000 books per year were eligible. The grant went to the Peninsula Library System and all but a couple of libraries qualified. This adopter wasn't eligible at the time because it used the county processing center. It had to be doing its own cataloging. Three libraries formed a consortium to do shared RLIN cataloging. They have one RLIN ID number and divided the first-time costs. One library does all the bookkeeping.

1982: The Library kept doing more and more in-house cataloging (travel books, etc.). To facilitate that, it got search-only on RLIN. RLIN was having a rough time, OCLC had a larger database; it would have gone with OCLC but they did not have search-only. The Library got a TI send/receive terminal to do search-only.

The Library decided it wanted to leave the county; it was raising the price of cataloging per volume to $9. There was a time lag to accommodate the county branches. The Library asked if it could join the consortium.

April 1983: The Library began on RLIN, but officially dropped the county processing center at the end of the fiscal year (June 1983). Another library came into the county processing center so it offset the Library's departure.

The Library reapplied to the state for the startup money. In addition, the state pays a bonus per record added to the state DB. Burlingame does the claiming. (Another library also reapplied but has never used the money; they have no room in-house for cataloging.)

1984: San Mateo has joined the Burlingame consortium.

3. Adaptations

None yet;

- want to connect automated circulation to cataloging
- want to start doing phonograph records on RLIN (put it into A-V librarian's time - she has to learn RLIN).

4. Barriers

- director of the Library's loyalty to county processing center
- RLIN's own problems at the time the Library joined. RLIN implemented a new system just as we came up. There was mismanagement, equipment problems (they were sharing equipment with Stanford). In addition, there were changes at CLASS (the broker organization) - person didn't know what he was doing. Being new, we never knew whether a problem was ours or RLIN's.

5. Facilitators

- county processing center's service so bad
- other peninsula libraries' choice of RLIN
- existence of Burlingame consortium
- State Library's database project and the grant money was distributed to encourage the production of machine-readable records
- RLIN's search-only capability
- Technical services head's opportunity to learn searching on OCLC
- Other RLIN features [OCLC can't retrieve records only on archive tapes], services of CLASS, RLIN's agreements with WLN.

6. Level and Extent of Use

10.5/11

11/24

7. Use Configuration

They have 1 terminal (plus search-only capacity now in reference for ILL). Equivalent of 2 FTEs strictly RLIN. They do not use it for pre-order searching, or for acquiring items. They use it for most cataloging, occasionally for conversion (the actual project on RLIN is too expensive), and for some ILL searching. They do not use it to place ILL requests. They use it for some authority control, also use LC name authority microfiche. They do not use it for serials control or for serials union list. They use it a little for collection development to see if someone else has it, but are more likely to use their automated circulation system for that (also a consortium).

$ predicted on book budget - per volume cost.

8. Benefits

- saved $25,000 the first year (partly because the county processing center's charges included their overhead) including staff reduction of 16 hours per week (person went to another department)
- speed of cataloging
- being able to set own destiny, to choose which books to do first
- have talked to the city government/employees union for last two years, attempting to get my job reclassified (citing money saved and my instrumental role)

9. Costs

None to speak of.

10. Subjective Benefit-Cost Ratio

5:5

11. Continuation/Routinization

6/7

12. Secondary Diffusion

- South San Francisco considering leaving the county processing center; they came around to see RLIN.
- have talked to San Bruno Library
- have talked to San Mateo - went to a meeting there with the city administrator, and business people (they have subsequently joined the consortium).

13. Other Relevant Information

- Director of library force for status quo across the board (even in face of severe problem)
- RLIN consortium and Peninsula Library System clearly peer groups of importance
- innovation in this case clearly pushed by need to solve processing problem.

CASE STUDY 33

OUTPUT PERFORMANCE MEASURES — NON-ADOPTER

1. Adoption Date and Classification

The Library, through its new director, has decided to implement OPM according to the ALA guidelines. Whether or not she will be able to actually do OPM right away is an open question since they are planning for a new library building.

2. Adoption Process

Awareness: The new director had been the assistant director for one year at the Library; she had come from the outside. She has had the ALA book for several years. She is interested in OPM. The city wants performance measures too, and feels that the objectives in the library budget have not been performance indicators. So the new director has been focusing on setting objectives for individual program budgets - to try to figure out what the measures might be. None of these measures will appear in the city-wide budget because they are at the library program level. Of course, some data they collect will be information they already collect so as not to make the task too difficult.

Adoption: OPM is getting started with one branch library that is a joint city/county library with a largely Hispanic population. The branch librarian has met with the County librarian. This year (1984-85) they are going to focus on increasing the turnover rate, increasing the number of library visitors, and increasing the reference fill rate. They are working to develop an appropriate measure for branch reference fill rate to set a benchmark figure.

As for the main library, they have no idea what the reference fill rate is and have to develop a benchmark figure for that, too. This year through a week-long survey in September 1984, they want to discover the baseline for both reference fill rate (determined by staff) and title fill rate (determined by users).

Through the Peninsula Library System, they are participating in a PLA planning process, with funding from a system-wide LSCA grant to do so. But planning takes lots of money to implement. They want to get training for both planning and OPM. Library directors will meet in a retreat to determine needs for staff development, then representatives from each library will attend workshops. The Library director wants a workshop on OPM. If they don't get money from the state for all this, library can apply to a local foundation.

3. Adaptations

Library has not reached this in the implementation process.

4. Barriers

The city announced that they wanted OPM, then backtracked because they were swamped with other work. "Hard because we'd gotten geared up."

5. Facilitators

Having a new library administrator (the respondent).
Having the assistant to the city manager putting the pressure on.

6. Level and Extent of Use

4/11
N/A

7. Use Configuration

The library already keeps some of the stats, although they've not done per capita figuring or analyzed the data: e.g., circulation and number of library visits. They also keep track of registration percent, but haven't used it in formal reports (etc., etc.).

8. Benefits

We'll have a context for all the enormous number of statistics we keep. We were measuring but not the quality of (services), not expressing them in meaningful terms., e.g., per capita. Now we start to say, "Are people getting their money's worth?"

9. Costs

There may be staff costs: time on OPM may detract from public service. There may be "too much emphasis on figures - you have to look beyond." "Instead we might have more programming; but we're trying to figure a way to do it (OPM) without taking too much time."

10. Subjective Benefit-Cost Ratio

N/A

11. Continuation/Routinization

N/A

12. Secondary Diffusion

She's talked to the other PLS directors and the County librarian in particular.

13. Other Relevant Information

Highlights: Director's concerns are right in line with someone just starting out. Another case of city government push.

CASE STUDY 34

BIBLIOGRAPHIC UTILITY — MID-ADOPTER

1. Adoption Date and Classification

1981-82 County adopted OCLC as a shared facility among a number of libraries including the Library. Informant believes they were last to adopt in state because they were last to establish a county system.

2. Adoption Process

1979-80: County Library Association discussed possibility of shared cataloging and interlibrary loan.

Grant proposal was written to state of get LSCA funds for equipment and start-up. County agreed to pay continuing costs.

Librarian played key role as local LA president through decision and adoption period.

3. Adaptations

ILL subsystem added January 1984. More libraries now in system.

4. Barriers

Small size of libraries.

Lack of an organized collective entity to receive funds until 1980.

5. Facilitators

(1) Leadership initiative of librarian (who was also innovator-early adopter of OPM)

(2) Federal funds administered by State

(3) County financial support

(4) County-level facility to implement (finally).

6. Level and Extent of Use

9/11
10/24

7. Use Configuration

N/A

8. Benefits

Access to other library holdings
Saved time on typing cards

9. Costs

None to city

County start-up: Year 1: $60,000
Year 2: $35,000
Plus maintenance cost in county budget (line item)

10. Subjective Benefit-Cost Ratio

4:4

11. Continuation/Routinization

3/7

12. Secondary Diffusion

Only within county, other city/town libraries joining.

CASE STUDY 35

ONLINE SEARCHING — NON-ADOPTER

1. Adoption Date and Classification

Never seriously considered.

Does have access through a small university library in city and in nearby big city public library but no instances of use of either.

2. Adoption Process

Have established online careers-jobs information database which indicates technical capability for OLS.

The librarian became aware of OLS as a student at Pittsburg, in 1973. At that time, used NYT database; did not use DIALOG.

Serious interest has never developed for use at Library. "Too many other needs come first; that would be icing on the cake."

Librarian has started a "technology committee" within her board. Her hope is to acquire microcomputers which would be directly accessible to users and serve a variety of users but mostly to bring the experience of computers to her clientele which is generally poor and minority. As for library-specific technology, her first priority is an automated circulation system.

3. Adaptations

N/A

4. Barriers

Not seen as relevant to clientele who are low education and low socio-economic status.

Resources limited.

Lack of demand.

Limited size of collection would require users to seek cited items elsewhere in any case.

5. Facilitators

Library head familiar with OLS and Library Technology Cooperative Board.

Some experience with offering search services for non-bibliographic requests.

Library head innovative and sophisticated user of OPM.

6. Level and Extent of Use

1/11
0/16

7. Use Configuration

Service available in nearby University Library and in fairly near large city public library, but not used.

8. Benefits

N/A

9. Costs

N/A

10. Subjective Benefit-Cost Ratio

N/A

11. Continuation/Routinization

N/A

12. Secondary Diffusion

N/A

13. Other Relevant Information

Library facility is located in a part of the city that highly educated and affluent users are not likely to frequent.

CASE STUDY 36

OUTPUT PERFORMANCE MEASURES — EARLY ADOPTER

1. Adoption Date and Classification

October 1981; first survey, roughly one year after prototype survey done at Baltimore County. Therefore a very early adopter.

2. Adoption Process

Librarian not exposed to the concept in Library School (Pitt MLS, 1973) but remembers thinking there had to be a better way to measure effectiveness when she was working in a public library in college. The only figures they had then were circulation.

The librarian was active in the State Library Association and a frequent attendee at workshops and seminars. Through this activity she came to the attention of the new State Library Chief, a member of the "Maryland Mafia" and former staff member at Baltimore County, and was asked by the county's consultant to serve on the PLA committee which was preparing and field testing the manual.

When she became a committee member (Feb/March 1981) "it was a foregone conclusion" that her library would use the manual and "experiment" with the measures proposed.

Because it was a small library in which she was the only fully credentialed librarian, she was able to have complete control of the process and, in fact, did all the work on the survey herself. Because the manual specified that measurement had to be performed in a certain way she did not want to rely on volunteers. For example, it was important to say exactly the same thing to each patron coming in the door. The people of this community were not accustomed to having anyone ask their opinion about anything. Therefore they were suspicious initially. However, when she explained that the library wanted to do a better job for them, their fears were relieved, and many "got real excited about being asked". The community became much more aware of the library. Children were also asked to respond if they were old enough to print.

3. Adaptations

The survey has been readministered during a two week sample period each fall and spring. There have been no significant changes although survey forms have been simplified and she has learned not to rely only on signs to instruct patrons. For example, patrons frequently are "too polite" returning books to shelves even when the sign says not to.

4. Barriers

Initial patron suspiciousness, but easily overcome; no serious barriers.

5. Facilitators

Clear understanding of process by librarian.

Her network involvement, committee and meeting participation.

Her long-time interest in the problem.

Her control over her own library environment.

Support by State Library Chief.

Small size of the library.

Proximity (driving distance) to developers.

Uncertainty by board on what decisions to make for library improvement.

6. Level and Extent of Use

8/11

60/66; she also cites very substantial utilization of OPM in working with her board.

7. Use Configuration

She develops all OPM measures as specified in the manual and conducts twice-yearly patron surveys. All work on OPM including tabulations is done by herself. She has made presentations to her board which show comparative data on key dimensions across five libraries. In most of these comparisons her library ranked dramatically lower than all the other libraries. These facts shocked the board into action, opening up an endowment fund which they had been sitting on.

8. Benefits

- It was a catalyst to make board see the need for change.
- It showed how ineffectively the library was serving the community.
- It pointed to ways in which it could be changed.
- It also helped her with acquisitions decisions and was useful in showing staff why books sometimes should be thrown away.

9. Costs

Social: None.

Opportunity: None.

Financial: "Just my time, which I control." (In actuality probably no more than the equivalent of 2 or 3 working weeks per year.)

10. Subjective Benefit-Cost Ratio

5:4

11. Continuation/Routinization

3/7; actually committed to continued use, but size of library, low cost, and fact that all operations are done by herself yields a low C/R score.

12. Secondary Diffusion

The State Library Director now requires OPM as a pre-condition for acquiring LSCA funds. For this reason the county library now has an OPM committee on which the city librarian plays a key role. Clearly the fact that the city of this case study was such a successful adopter will serve as a useful model within the county and possibly in other areas of the State.

13. Other Relevant Information

The case suggests the potential of OPM for smaller city libraries, particularly to gain political leverage for change. It also shows the strong role played by librarians who exert leadership initiative and are tied in to formal and informal innovation networks.

CASE STUDY 38

ONLINE SEARCHING — LATE ADOPTER

1. Adoption Date and Classification

1983, Late.

2. Adoption Process

- Innovator can't pinpoint first awareness; not in MLS training.
- Trained at City Library for N.Y.T. 1975-76.
- Deliberately held off for a long time.
- Library priorities were on acquisition of materials for direct public use.
- Also perceived that they were paying State for this function (State used DIALOG).
- Innovator kept bringing up OLS at staff meetings.
- As more databases and features became available it became more attractive.
- As costs came down it also became more attractive.
- Adoption triggered by State dropping NYT OLS in 1981 without warning (actually State picked it up again later). This signalled county that the State was unreliable source.
- Also at this time Lockheed began to offer DIALOG on pay-as-you-go basis without up-front fee.
- County also has two specific uses for OLS.

  (1) More rapid answers to ready reference questions.

  (2) Savings from dropping standing orders for rarely used journals and hardcopy references sources
- Four were trained in February 1983 but already had equipment. Of the four only one is now left.
- Branches do not yet have terminals for OLS; $2,500 set aside out of standing order budget for OLS.

3. Adaptations

Reference staff in branches have received familiarization training but usually find reference answers manually.

Two more staff have been sent for training. "We definitely see this as non-important in the future."

4. Barriers

(1) Not seen as a priority public library service.

(2) Funds.

(3) Fact that funds were seen as allocated to a State-level agency for this fuction.

5. Facilitators

(1) Awareness, interest, training, persistence and initiative of innovator librarian.

(2) Lapse of state service at critical juncture.

6. Level and Extent of Use

9/11

7/16

7. Use Configuration

- One part-time terminal.
- Three part-time trained operators.
- No direct access from branches.
- Users cannot request searches directly, only in judgement of the reference librarian.
- Service is free.
- Service is not advertised.

- DIALOG is only vendor now used.
- There is a set-aside of $2,500 in the annual "materials" line budget for OLS.

8. Benefits

(1) Boolean search capacity, hard to do searches on two descriptors simultaneously manually.

(2) Access to fairly recent material (4 weeks old).

(3) Expands resources available to answer reference questions.

(4) Quick answers to reference questions.

(5) May later save us money on some marginal standing orders. (Have not cut any orders yet because of OLS.)

9. Costs

Social: None; staff looked forward to it and reacted to training with enthusiasm.

Opportunity: None; getting circulation online was a much higher priority so that was done first.

Financial: $1,500 (i.e., fairly minimal under new Lockheed arrangement).

10. Subjective Benefit-Cost Ratio

3:5

11. Continuation/Routinization

4/7

Not in regular budget, no descriptive materials, no real staff role changes and no facility changes but actively exploring additional features as they come online, ways to make service available through terminals (micros) that branches will have in future, doing a lot to prepare staff including training for some and verbally committed now to continued use.

12. Secondary Diffusion

Only brief orientations for branch staff. None outside, low profile.

13. Other Relevant Information

County is an acknowledged national leader in some areas, especially use of output peformance measures and planning processes. Decisions on OLS appear to have been made rationally, based on clearly understood assumptions and weighing of priorities.

CASE STUDY 39

OUTPUT PERFORMANCE MEASURES — EARLY ADOPTER

1. Adoption Date and Classification

It is somewhat difficult to establish the adoption date. Some form of OPM was going on in one branch library as early as 1972. (Branch librarian wanted to determine the turnover of his stock.)

1977	The county library adopted 5 year plan which included a formal management-by-objectives (MBO) process, contract work with King Research.
1980	Probable date by which a recognizable OPM prototype system was in place in county as a whole.
1982	Date by which all OPM's were tested by County Library.

Original adopter collaborating fully in development process.

2. Adoption Process

Nationally known library science professor from Rutgers University (DeProspo) came to speak in 1973 or 1974. One of his students then came to do studies of the state system, interviewed the "Director of Library Development and Services" in the State Education Department and then interviewed County Librarians, asking how collections were used. Our chief informant had never thought of this issue before that time.

The person most involved now with OPM in a technical sense had started an information and referral service for the City as early as 1973 and reports that she "had always had an inclination to measurement". One branch librarian had begun to look at OPM in terms of stock turnover as early as 1972 and his initiatives had sparked interest at the county level.

DeProspo's manual given to each branch (1973-4) and studied by ad hoc committee; Librarian's work in his branch spurred interest.

Committee could not agree to adopt manual's program fully and could not agree on an alternative. They did not like his suggested source "The American Book Publisher's Record" and felt it was an artificial exercise to make a random survey of holdings to determine if they were adequately representative if all English Language publications.

Nevertheless some staff started trying to use DeProspo's manual and the ad hoc committee met monthly for 6-7 months (1974). By 1978 there was a lot of experimentation going on at different branches.

The catalyst for this activity appears to have been the Long Range Plan adopted in June 1977 with the overall objective "to satisfy demand". An $80,000 grant was received from the Division of Library Development Services, and was administered in cooperation with King Research. This was federal money (LSCA) administered by the State Education Department.

The plan was important in at least four ways:

- it helped clarify library goals and priorities
- it set up an annual review process in which progress would be measured against the plan
- it required each branch to establish some kind of MBO process
- perhaps most importantly it led the central staff to encourage experimentation by each branch in mini projects focussed usually on one aspect of OPM and each lasting only a fraction of a year. The MBO process was not tightly administered and those who did not fully cooperate did not "have their feet held to the fire".

This experimentation among the branches appears to have been tracked and documented fairly well by the County Library during the late 1970s. Early studies were of "title fill rate" (how often the library could deliver when specific titles were requested) and "materials availability". During this time a state consultant would visit them regularly and would get new ideas for statewide use from these visits.

The County Library pilot tested a statewide survey on "materials availability" in winter of 1979-80. That instrument was then refined through many meetings involving state and County Library staff, leading to a statewide survey in the fall of 1981: "Materials Availability and User Satisfaction Survey (MAUSS)". Thus was added the concept of user "satisfaction" (accomplished by interviewing all in-library users on designated days).

The formal MBO process was dropped in 1982 with a view that people on staff and in branches were thinking this way anyway now. There was a hiatus of one year before second five yeard plan launched in 1983. Members of staff were members of key ALA and PLA committees. They pressed for new library standards and mission statements, leading to 1981 KRI contract to write them.

The County Library then became the key test environment for all the proposed new standards. One County Library branch tested them all in 1982; then there were minor formatting revisions and by 1983 all branches had used them at least twice. "We will continue to do it by the book for some years to come."

It is evident that the County Library is important in at least three ways for out-diffusion:

- as a test site for initial debugging and developing before guidelines are dispensed to others.
- as a model site for other libraries to look at and emulate.
- as an active promoter of guidelines through committee memberships and informal networking.

A state committee was formed to implement statewide standards in Maryland. Also a former County Library staff member is now Library Director for the State Library of Pennsylvania and has tied OPM adoption to acquisition of federal grant funds in that state. Workshops have been run in 3 other parts of the state by the County Library OPM specialist. She also serves on ALA goals, guidelines and standards committees and has organized ALA and PLA conference programs around OPM. The emphasis in these sessions is on giving people a sense of how measures can be useful in both small and large library contexts.

June 1985 will mark the first nationwide reporting on OPM and the intent is to encourage more libraries to use them. With 8,000 copies of the guidelines now sold, it is important to know who is using what.

3. Adaptations

It is clear that many adaptations were made within the County Library and its branches from the time of the original introduction of the concept of OPM through the establishment of the full set of guidelines. However, as of complete adoption in 1982 there is a current commitment not to make further changes in the near future, seemingly so that the County Library can stand as a clear and consistent model for others to follow.

4. Barriers

No obvious barriers to implementation.

5. Facilitators

- Leadership of County Library staff in innovation among PL's.
- Centrality of County Library staff in professional networks.
- Support of state Department of Education.
- Federal funds.
- Commitment to planning process; outcome orientation.
- Client-user orientation.
- Diverse creative early efforts within branches.
- Flexible, light-handed but persistent administration of the 5 year planning process and the MBO process.

- Willingness of central staff to communicate and listen to inputs from inside (below: branches; and within central staff) and from outside (state department, outside consultants).

- Availability, proximity of expert consultants (KRI).

- Total commitment of the Director to the process.

- System innovativeness: "A lot of change in the system is going on all the time".

The committee structure within County Library which allowed branches to participate in change process, contribute ideas, and also allowed central staff to get an idea of what was going on in branches without being excessively intrusive.

6. Level and Extent of Use

11/11
60/66

7. Use Configuration

County Library currently has in use each of the indices suggested in the ALA Guidelines, and they are operational in each of the 22 branches and satellites which constitute the County Library system. A senior measurement specialist oversees the programs and makes sure that all measures are documented, reported, and compared annually. There have been some efforts undertaken to use findings from OPM for specific policy and practice changes, but so far there is little evidence of significant institutional change resulting from OPM adoption.

8. Benefits

Benefits identified so far are mostly intangibles, e.g.,

- enables each branch and central office staff to get the "big picture" of how well and in what ways the library serves the county

- it illustrates that there are different patterns of use for different branches, different collections, different users

- it helps central office to define what staffing and materials should be (although, so far, how this influence is exerted is not very explicit)
- it makes the library structure and operations appear more "business-like"
- it makes the avowed "service orientation" of the County Library clearer
- it conveys to the county administration the impression that the library is a very well run operation.

One tangible outcome: The county administration backed off a proposal for a County Library staff cut of 10 persons when County Library management showed what the consequences would be in OPM terms.

9. Costs

County Library planners attempted and succeeded in minimizing costs of implementation. This was accomplished in at least 4 ways:

- Building initially on the initiative of those branches and individuals who were already motivated long before the whole system was involved.
- Phasing in gradually over a period of four or five years, with successive approximations each year to simplify and streamline the process so that later adopters with lower skills and motivation would have an easier time.
- Emphasizing the sampling approach so that each branch would be required to be engaged fully in the additional activity for only two weeks spaced throughout the year. This also minimized client inconvenience, and central office data processing costs.
- Making minimal use of either high technology or elaborate statistical procedures so that every staff member was doing something they felt fully competent to do.

Informants thought there were no opportunity costs and negligible additional financial costs. Branch staff performed OPM as a part of their regular duties and the Central Office coordinator merely added this function, changing her role modestly to include it.

10. Subjective Benefit-Cost Ratio

5:5

11. Continuation/Routinization

Commitment to continution is strong ("absolutely") and reflected in the 1983 5 year plan.

5/7

12. Secondary Diffusion

Internal diffusion (among branches) has been total.

External diffusion substantial and varied: State and national through training workshops, association committee work, demonstrations and personnel migration. (See Section 2.5)

13. Other Relevant Information

It is noteworthly that this site puts minimal emphasis on hardware technology and indeed lags other major library systems in this regard. It is also not clear that OPM has or will lead to more innovativeness in other areas. Rather, it appears so far to have reinforced senior staff views that primary mission is to give maximum availability to books which users want, protecting direct book services and related personnel and facilities and moving very slowly on changes which would threaten the budgets for these items.

CASE STUDY 40

BIBLIOGRAPHIC UTILITY — EARLY ADOPTER

1. Adoption Date and Classification

Library began using RLIN in 1978, as soon as it was available, making it an early adopter.

2. Adoption Process

Awareness: The head of the library "heard about it when it was being thought of." She had ties to one of the developers, and contacts in the computer world in general. She "knows more about computers than about libraries." She also read Stanford publications and had ties to Stanford.

Adoption: Although the main corporation library on the east coast had gone with OCLC, she went with RLIN because it was aimed more towards an integrated system and distributive computing than OCLC. But is was on philosophy matters (ties to Stanford, etc.) more than anything that made her choose RLIN. It was relatively easy to get acquisition of RLIN approved because the library had DIALOG already and so "had a foot in the door." She did not mind using an experimental system. To implement RLIN she needed extra funds, but her boss at the time was a "forward-looking, favorable boss, young and imaginative, intrigued with ideas." She introduced him to computers. "He trusted me implicitly; I would present a plan, give him the numbers."

Implementation: Implementation went smoothly, but she wishes she had a programmer. Having RLIN has had little effect on users, but it should be available to every scientist at his/her desk. She wants to develop a user interface. Since RLIN, the library has added several fully staffed branches. They now buy 250 books where previously it was 100. RLIN made this increase possible. In fact, she managed to create the branches despite the research center's dismay.

3. Adaptations

The library has added a printer for RLIN; they have created a microfiche catalog. They have added RLIN acquisitions.

4. Barriers

She focused on RLIN characteristics, for example, the insistence on a RLIN terminal that was "antique" - "I resent being forced to buy a hard wire terminal." She did not like the dedicated phone line. She feels the documentation is "baroque".

5. Facilitators

Her boss was "the only thing that counted." Adopting RLIN would not have been possible without him.

6. Level and Extent of Use

11/11
10/24

7. Use Configuration

They have one dedicated terminal, but are getting an IBM that will be flexible. Cataloging is done about 20 hours per week. RLIN is a part of the line item for computer services.

8. Benefits

RLIN has provided a cost benefit: The library can handle more work with the same staff. Because of RLIN, the main library is able to do centralized work for the whole network; RLIN helped get the network together. They do recordkeeping for the branch libraries, which don't need customized technical services.

9. **Costs**

None to speak of, except that the library had to discontinue the card catalog, making the scientists unhappy. It's now on microfiche.

10. **Subjective Benefit-Cost Ratio**

5:5

11. **Continuation/Routinization**

7/7

12. **Secondary Diffusion**

The library head has not written about RLIN specifically, but she gives a lot of talks and questions come up.

CASE STUDY 41

ONLINE SEARCHING — MID-ADOPTER

1. Adoption Date and Classification

Circa 1972-73, instituted OLS with DIALOG; BRS was added in 1977 for searching the internal database that is included in it; in 1979, the Research Center library began searching other databases on BRS. Now, however, their use of it is negligible (see #7 below for more on use).

2. Adoption Process

Awareness: The now head librarian was aware of the development of OLS prior to 1972-73 (respondent/head librarian-"DIALOG mother"). Her husband works at Lockheed; Roger Summit is a friend. "The Lockheed librarian is my patron saint." Respondent was for OLS capacity in the library, but the head librarian at the time said computers had no future. "She fought me every inch of the way."

Adoption/Early Implementation: 1973 scientists at the Research Center gave the respondent a terminal, a Beehive. "The scientists wanted me to have the service." The head librarian wouldn't give her the money to be trained, so through trial and error she learned searching. The head librarian became ill; was absent a lot. The terminal the respondent had use of was taken away, but the Research Center administration changed and the new head of the Research Center was a computer scientist. "It was again personal: he came in, thought I was deserving. The first (Xerox) ALTO around, he took away from the lab manager and gave it to me."

By 1974, the head librarian was working 1 day per month. In March 1975, the respondent became the head librarian. She was not only the searcher but also the professional. She performed 20-30 searches per month. By 1977 the library had acquired a TI745. In addition, the respondent had finally "got rid of" the reference librarian, who had only a high school degree and was standing in the way of library progress. By 1978, she had her first professional librarian on staff, who also did searching. At the same time she was upgrading the main library, she began "building a network, building head count." She publicized the service by word of month and in a monthly newsletter. Services to three branch libraries in subsidiaries began in 1978 and 1979. Main library staff would insist to be available; they would do search interviews, return to Research Center to perform searches.

Later Implementation: After the next two librarians were hired, the staff specialized for a while because of the requirements for searching many databases. The head of branch services (who was the first professional hired) commented that there seemed to be two waves of data systems. In the first, several years ago, many new systems appeared, many of which required their own terminal and/or a whole new command language. "We were reluctant to get involved with more vendors, and suggested that these new ones get on DIALOG, which many of them did." In the second wave, beginning a couple of years ago, new systems appeared such as Newsnet, TechWatch; "somehow it seemed more reasonable for them to be unique." Since their command languages were not too arcane, the library staff learned these. She couldn't say whether this was due to the field's progress or the library's progress.

1981-1983: The branch libraries, one by one, began doing their own searches as they became permanently staffed. (One started in 1981, one in 1982, and one in 1983.) At this point in the main library, all professional staff did searching. They do 50 searches per month now. One person is "Search Queen" each month and distributes searches. They have more terminals now and can print remotely.

3. Adaptations

They are now in the process of trying to get users to search themselves. Has not been successful. Have offered training - people didn't sign up for it. They are also now training paraprofessional staff to search. They are also shifting the focus of the library from an all-tech to a mixture to tech and marketing/business (see below on use).

4. **Barriers**

Lack of money and the hostility of the librarian.

5. **Facilitators**

The scientist who went out and bought DIALOG for her and gave her use of a terminal.

6. **Level and Extent of Use**

10/11
14/16

7. **Use Configuration**

The library has 6 terminals, 5 staff search for an equivalent of 1 FTE. Research Center users are not charged. Non-Research Center users are charged back to branch librarians so their companies pay. They sometimes search with users present, but these tend to be people new to the service. They have offered to teach users to do it themselves as noted above, but "when they find out the complexities", they say no. Only a few do their own searching. They are shifting more and more to marketing and business information. They do 80% of their searching on DIALOG, with the rest being allocated among marketing and business databases such as Newsnet, Pergamon Infoline, Dun and Bradstreet online, etc. They search the corporate databases on BRS (n=15, e.g., patents, reports) about 2% of the time and otherwise do not use BRS. They also have local corporate records on their Star System. The main research library is in Webster, NY; a third library is in Canada.

The main library's clients include all Research Center scientists; personnel in subsidiary companies through the branch libraries; and R&D in other divisions, e.g., scientists and marketing staff in office products and office systems. The marketing people especially are discovering the usefulness of OLS and one main library staff member is currently detailed to serve them.

This library is located in the administration division, reporting to the director.

8. Benefits

"Online searching is the fulcrum on which I've been able to build my network" - head librarian.

9. Costs

None, except that the library had to do away with printed indexes, which was hard on some users.

10. Subjective Benefit-Cost Ratio

5:5 (if the library can implement its OLS plans) or 5:1 (if it can't: if OLS stays at the same level, the library will be so far behind that costs will outweigh benefits).

11. Continuation/Routinization

7/7

12. Secondary Diffusion

Head librarian wrote a basic article on DIALOG for Spectrum. Corporation (maybe only Research Center) "became aware of DIALOG as an object of study through me" - respondent (current head).

- They have publicized it to users.
- They have written articles, made speeches, etc.
- The library has hosted user group meetings
- The branch libraries installed OLS.

13. Other Relevant Information

Highlights: The head librarian commented that "I don't think I would be in this business if it weren't for computers." Definitely technologically oriented.

For all her orientation, the library seemed traditional somehow; and not part of the lifeline of the research center maybe.

Head librarian works very much through manipulation of senior officers.

Hard to tell whether her strategy came because of organizational barriers or the barriers came because of her personality and style.

Early adopter of OLS; early adopter of BRS, too. OLS was lever for library transformation.

CASE STUDY 47

ONLINE SEARCHING — MID-ADOPTER

1. Adoption Date and Classification

Decision to adopt, 1977; OLS through BRS in place by end of 1978, making Library mid-adopter of OLS.

2. Adoption Process

Awareness: The respondent, though not working at the company, had been tracking the development of OLS since at least 1974 through reading professional literature, attending professional conferences, and talking to colleagues. She assessed number of databases, cost of access and equipment. She came to the company in 1976, found the research library director (there was not overall director of libraries then) not computer-oriented so nothing happened. But in 1977, the respondent became head of the research library and immediately set out to institute OLS.

Adoption: The library decided to go with BRS because it had the databases they needed (e.g., NTIS and Engineering Index), and in addition, it was highly user friendly and startup costs were minimal for access. The respondent wrote a justification statement for company, which is a 2-step process: Sell the idea/justify the system to a senior management person; then market it internally to get use and evaluation data. Information services are provided on a charge-back/cost-recovery basis, so charging for OLS was not a stumbling block for users.

Early Implementation: By the end of 1978 OLS was running. One information specialist had been trained and searched on a 300-baud machine, averaging three searches per day. After the first six months, it was clear that the service was paying for itself. Users were requesting more searches because OLS was faster, less expensive than hand searching. This led to an easy adoption at the Life Sciences Library - in both cases, the impetus for OLS came from the library staff rather than users. The company management library came after that; the Burlington library was established with OLS.

3. Adaptations

Later Implementation/Adaptations: All professional library staff (7) were trained. Then paraprofessionals (6) were trained and then technical services area personnel for ILL bibliographic verification. Over the years OLS has become more complicated so the director has enforced some degree of specialization in subject matter as part of quality control. In 1981, the Research Library aquired a 1200-baud terminal and in 1983 they bought a personal computer. Now they do six searches per day.

She feels that company leaped late into non-bibliographic services (e.g., Computstat, Chase IP Sharp) which "market to different crowd and don't know library language." "If you don't make the leap early, it's much more difficult," she says.

Searches are not done with user present except for demonstration purposes. In fact, the library is meeting resistance in its efforts to train users to use Chase Econometrics which is specially designed for end-users. It's part of corporate culture that users are "accustomed to buying expertise from others."

4. Barriers

Only initially, in that the research library director at the time was not computer-oriented. Lethargy and writing the justification statement were cited but not as major inhibitors.

5. Facilitators

- In 1978, computers were "hot."
- Respondent became director, thought OLS was needed.
- Company corporate culture: "The company supports innovation."

- "Users were accustomed to paying for information."

- The chief research specialist was extremely interested and learned how to use OLS.

- Cost-recovery policy meant that the library had to presuade the company only to give OLS a chance, not to pay for it - "a limited risk."

6. Level and Extent of Use

10.5/11

14/16

7. Use Configuration

The library performs about 6 searches per day now, which would mean 30 x 20 working days = 600 per month. They work on different databases in sports, depending on the company's projects, so it was hard for her to assign percentages of use to different databases. Guesstimates would make DIALOG the leader with 40%, with BRS at 10%. However, they use about 16 other information systems, some such as Nexis, Newsnet, and Compustat very heavily. OLS was instituted with BRS, but DIALOG and SDC were added within six months, and the others as they were developed and judged relevant.

In addition to the 1200-baud/variable baud terminal, she mentioned a 9600-baud terminal that's dedicated to full text bibliographic searching on Meadnet from Mead Data Central (is 9600-baud possible or is that a model number? - I haven't rechecked.). The marketing people especially are discovering the usefulness of OLS and one main library staff member is currently detailed to serve them.

8. Benefits

Can get information fast, in a day rather than a week, a real value in an organization that works on a tight time frame.

The computer product is impressive to consultants who work at the cutting edge of their professions. They began to recognize library information specialists as part of the team.

- It is also impressive to clients.
- OLS kept information services at library lively and viable. It increased the library's credibility and made it more eligible to manage new data sources. "If you don't manage (new areas such as OLS), someone else will."
- OLS brought the library a lot of attention.
- It was one way for many users to become comfortable with computer services.
- High quality information, fast turnaround, reasonable price.

9. Costs

None.

10. Subjective Benefit-Cost Ratio

5:5

11. Continuation/Routinization

7/7

12. Secondary Diffusion

Talks with and presentations to other professional colleagues; internal marketing/education to users ("an educated user is a big help"), (wrote articles, had lunchtime seminars, etc.) developed and shared procedures manual for managing OLS.

CASE STUDY 48

OUTPUT MEASURES — NON-ADOPTER

1. Adoption Date and Classification

The company research library is certainly a non-adopter of OPM as configured in the ALA version. The kinds of data in the ALA model are not relevant.

2. Adoption Process

The Company Research Library keeps records of 2 kinds of data: expense-related items and time-related items. In the former, statistics are maintained and analyzed on number of online searches conducted, number of databases searched, connect time, who has requested searches, ILL activity, etc. Users at company have "always" been charged for information so any changes in service can be analyzed for impact on amount of service given and cost of that service. For example, the director of libraries was able to tell me that institution of OLS resulted in more information being provided to users at less expense.

The director of libraries makes a budget plan every year; she analyzes the budget on a monthly basis to prepare quarterly variance analyses.

In the second kind of record-keeping, the director of libraries monitors how library staff spend their time. Their time during the work day is tracked in 15-minute increments and allocated to tasks attributable either to overhead (library maintenance, shelving, cataloging, etc.) or case work for staff. For professional staff, the more time spent working with or for users, the better. Sheer client contact. Information relevant to this is entered into staff performance records for review by supervisors on a quarterly basis. Staff allocation of time also has implications for budget-making, of course.

CASE STUDY 50

ONLINE SEARCHING — LATE ADOPTER

1. Adoption Date and Classification

The central library installed OLS circa 1971-72 as an NLM pilot site for Medline. They added BRS in 1982 and are now emphasizing it over DIALOG. Can be considered a late, enthusiastic adopter of BRS.

2. Adoption Process

Awareness/Adoption: Head of the library then not very active, but did promote participation in the Medline project. Picked 10 administration libraries to participate - his "cronies." The administration hospital in DC may have been the first to get OLS, but the Central library was right in there among the first. At the time, more than 100 administration libraries were not oriented to medical staff; their traditional emphasis had always been books for patients, including bibliotherapy. The patient library aspect was then twice the size of services to medical staff. But the administration is heavily affiliated with medical schools; residents on the grounds needed information services.

Early Implementation: At the Central Library, three persons were trained, one primary, for OLS. They acquired a CRT with printer. Even with the incorporation of OLS, things were pretty traditional until 1975 when a new head of the library was named. He was interested in networking among the administration libraries and apparently in shifting the emphasis of the libraries from patients to medical staff. The central library was to play the role of network coordinator. The library staff at the time were largely librarians who put up a lot of resistance to the change of client audience. Many, however, did find it satisfying to serve medical personnel. But a second transition - that of librarians turning more to administrative/supervisory roles - was even more difficult for these patron-oriented librarians to deal with, and many retired. A third transition was the growing emphasis on audiovisuals.

Late Implementation: In addition to performing searches for the Central Administration staff, the central library began searching for branch libraries. The seven Regional Medical Education Centers (RMECs) got DIALOG with funding from the Central Library. By 1981 centralized funding for OLS was being used as a "carrot" for diffusion of OLS. The Central Library has been promoting OLS to its branch libraries through special grants for acquisition of terminals, connect time, training, etc. The result is that all but 16 sites have OLS access to Medline on the premises. The 175 administration libraries in the VALNET system are organized into seven RMEC regions. The RMECs have DIALOG along with a few other libraries that have chosen to fund it on their own.

In 1982, they added BRS. The reference librarian who seemed to be the coordinator of online services told me that BRS "killed" SDC (which the administration has but is dropping): SDC's software and marketing were not competitive. Asked why they had not adopted BRS before, she said they were not aware of BRS' flexibility. It was apparent that BRS was focusing on medical; it was attractive; BRS was interested in user participation. The central Library has analyzed the overlap with DIALOG, e.g., now does not let VALNET libraries search Medline on DIALOG: too expensive. The Central Library has decided that BRS is the vendor to go with and is now promoting its diffusion through the VALNET libraries: some 70 or so have it at this point.

3. Adaptations

The Central Library has created a Union List of Audiovisuals, which is now a private online file available through BRS and contains more than 13,000 records. They are trying to obtain an online newsletter; they will adopt one electronic messaging format.

The Central Library has developed Medline training for VALNET libraries; they don't like BRS' Medline training. They have developed newsletters for sharing information among the participating libraries. They do need assessment among VALNET libraries. At the same time the Central Library continues its upgrading efforts among the VALNET libraries, it is focusing on training end-users, medical staff. For example, a scientist/medical person using a PC in a hospital pathology department would be an end-user. The reason for the central library's interest in end-user training is two-fold: Self-interest - the funds for use of computer for both the pathology department (for example) and the libraries comes from a common fund within automated data processing. It's in the library's interest to have end-users be as skillful as possible since they are all drawing down the same acount. Altruistic: The information systems are, in the respondent's words, "somewhat user-vicious." Training will enhance medical staff effectiveness; each center will develop its own criteria for who gets computer access. She felt the library had to be aware of these developments, since the industry is moving towards end-user access through development of software such as BRS Colleague, which the administration library is currently testing.

The Central Library does daily current awareness for key central administration staff, a service which is 50% information value and 50% PR for the library. They use OLS for reference.

4. Barriers

None.

5. Facilitators

None.

6. Level and extent of use

11/11

7. Use Configuration

The Central Library performs 230 searches per month; four people search for a total of 2 FTEs. Searches are not performed with the requesters present. Medline is searched about 50% of the time; DIALOG 30%; BRS 15%; Nexis 5%. The Central Library tests new databases and vendors; it closely monitors costs and checks use of searching by branches. They are exploring search and send possibilities, downloading on PCs, search, then transmit results electronically. This is to address turnaround time, which is a big problem (10 days). They do not charge anyone for searches or other services.

8. Benefits

Biggest benefit has been professional acceptance; the clinician has accepted the librarian as a team member. OLS has increased ILL; increased library staffing; increased grade levels; and increased client satisfication.

9. Costs

Not at Central Library, but in the branches, some have had terminal phobia. Rule across the board is: if you can't grasp searching, you're not in reference.

The impact of the deregulation of the telecommunication industry has yet to be understood. Is purpose.

10. Subjective Benefit-Cost Ratio

5:5

11. Continuation/Routinization

7/7

12. Secondary Diffusion

Central Library staff attend MLA, engage in library activities there in addition to other participation. The Central Library is a formal change agent in its relationship with VALNET libraries.

13. Other relevant information

Highlights: The library system has come a long way in a short time and OLS was a critical factor.

This library engages in formal, ongoing, planned diffusion of innovations to its VALNET libraries.

CASE STUDY 54

OUTPUT PERFORMANCE MEASURES — EARLY ADOPTER

1. Adoption Date and Classification

By order of the corporate executive committee in 1982 all cost centers were to begin "the process of revealing the true cost of service," beginning with the 1984 fiscal year (November 1983-October 1984). The corporate library is thus a new adopter of their own type of OPM.

2. Adoption Process

Awareness/Adoption: The corporate library began preparing for the new procedures in fiscal 1983 - keeping records, preplanning, devising averages. They had never based services on statistics but had only maintained basic reference data. Other staff functions - corporate manufacturing, corporate engineering, corporate computing - were affected as well. Prior to the cost exposure procedures, the library evaluated by feedback and usage figures. They did not charge for services.

Early Implementation (November 1983-January 1984): The executive committee and the comptroller did not inform users of this major change so there were many "ruffled feathers" and political problems when users began being charged for services.

An additional political problem was that the comptroller set the library's fee schedule ("it was all wrong") instead of leaving it to the library director, thereby violating a critical value of the corporate culture: managers get control as well as responsibility. Things were bad for the director of the library - sleepless nights - until the comptroller was told to back off. The library director revised the fee schedule and things began to even out. The process is not cost-recovery because the basic cost (capital) structure is not included.

The fee schedule is "a product of the imagination," in the sense that there are lost-leaders "to get users in," and popular items are higher in price. For example, the online catalog might go up in price - it's been very popular - while the basics may go down. The director thinks of himself as being in charge of a nonprofit organization within a profit organization. He mentioned learning to be an "intrapreneur", promoting library services within his company.

In the first three months after the change, usage dropped by 40%; the rate schedule was revised and publicity about the change soothed users' irritation at the seeming abruptness of the shift to charging. In the second three months, usage was picking up again. The director was trying to differentiate among information services not worth the effort: continuing resisters to the charges set, and the basic users.

The entire staff is involved in trying to save money by doing things in a new way as well as being innovative about answering users' questions. All staff, managers and workers alike, are rated for productivity, which is the "originality of performing their work." Employees are "not limited by barriers," but are expected to overcome them.

One example of creativity the director cited was the production of the Monthly Library Bulletin. A staff task force got together to work out producing it online; in so doing, they cut the production time from two weeks to one week, saved money, increased staff talents (in use of computers, etc.), and used an inhouse product.

Finally, the corporate library now charges the 15 branch libraries across the country for its services, so the director also thinks in terms of marketing to the branch libraries. In no case does money change hands; information services are billed to users' accounts through a location code.

3. Adaptations

Since they're just getting started, none to speak of, although the director did revise the fee schedule. But that was a change to get things in working order, not a higher level adaptation.

4. Barriers

The poor preparation of users - they were not told about the new charging policy ("that was not in my control" - the library director). (The executive committee blew it.)

The comptroller usurped the library director's responsibility by setting the initial rate sheet, which was all wrong.

5. Facilitators

Automation facilitated the institution of charging; the library could show relevance to users.

6. Level and Extent of Use

11/11
?/66

7. Use Configuration

The library has gone for the exposure of cost procedures in a big way. The various library managers do encumbrance accounting - unique in corporation - and check commitment of funds on a weekly basis. Budgets are checked monthly for variance, with an overall budget set once per year. A corporate manager is judged on adherence to targets; one's boss is informed about actions taken. A manager is given space to make mistakes; "it's how long you make mistakes" that counts. They use the figures to change activities and policies, but do not prepare reports, share with the outside, or compare with other libraries.

8. Benefits

- Everyone is more dollar-conscious, users are now willing to put bucks where there's a payback.
- It helps correct internal procedures, save money by exposing costs. "We can clean up our internal act."
- "It's a career challenge, especially for me" - the director.

9. Costs

The stress initially was enormous, especially on managers. "I lost many nights of sleep." (This was before the control problem was worked out.)

10. Subjective Benefit-Cost Ratio

3:5

11. Continuation/Routinization

5/7

12. Secondary Diffusion

Other libraries have called; Director has called others.

13. Other Relevant Information

Highlights: This may not be a typical instance of OPM, but the institution of cost exposure procedures has given the library a set of data on which to base decisions about services for the library. It appears that corporation was previously more like a public library than some other corporations.

This case was fascinating, because the director used the language of a beginner regarding this innovation, speaking of concerns, etc., whereas in his detailing of the two other innovations, he was self-assured, clearly on top of them.